# Making the right decision

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**More effective and productive construction work depends on combining technological advances such as building information modelling with processes that are internationally standardised, says Alan Muse**

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Cultural change and technological innovation are axiomatic. In the built environment, building information modelling (BIM) and big data promise much, but they have to overcome global industry challenges and fragmentation.

Various studies have shown that improving project performance is only possible by refining the decision-making process at each life cycle stage. In turn, this process can be improved by providing the right information in the right form at the right time. Developing standards for this information is therefore crucial.

Of course, we need open data standards at an IT level; but we also need standards in the professional work processes for those who are populating building information models, particularly those involved in the business management of the project.

However, accessing information is like turning on a fire hose: it can quickly overwhelm you. It therefore needs defining in accordance with the decisions made at each stage of the project life cycle.

Technology requires professional standards ? and, in terms of data collection, use of predictive data and general relevance, professional standards need technology. As BIM advances and technology disrupts property and construction, the need for international professional standards gets ever greater.

## Complex context

Recent trends, such as the push for sustainability, increased desire for public engagement and the globalisation of construction, have influenced the environment in which decisions are made. Consequently, decision-making models should adapt. More attention is being paid to technological development and networks, and this evolutionary, possibly chaotic, process needs to be managed and the collective intelligence of users harnessed to devise innovative solutions.

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Decision-making on construction projects involves the management of multiple, interrelated parameters such as quality, space, time and cost. The uncertainty associated with each of these, and the evolving relationships between them, is at the root of complexity in project management. Accounting for this complexity is critical if project managers are to plan effectively for contingencies and test the usefulness of alternative decision-making strategies. However, predicting the consequences of complex behaviour is difficult, as these often emerge in dynamic contexts.

A simple way to avoid making the wrong decisions at the wrong time is to establish a series of gateways, at which the project team compiles information describing the current status of the project, and the client assesses that information then either asks for changes or gives its approval and instructs the contractor to progress to the next stage.

At each of these stages, certain aspects of the project may be frozen and procedures introduced to control change. For example, at the end of the concept design stage, the project brief may be frozen, meaning that it can only be changed with the explicit agreement of the client when the cost implications and the disruption have been evaluated and accepted and the change itself recorded.

By progressively reviewing and approving aspects of the project, it moves forward in a controlled way. If this strategy is not adopted, the client and project team can lose focus, uncertain of what has been decided and what has not, and unable to make progress. There can also be ?scope creep?, where instructions are given but no proper assessment is made of whether the instructed work is included in existing fees, whether it has been authorised and whether it is a sensible use of the clients? funds. BIM can substantially help with this staged decision-making process.

## Staged gateway data drops

To ensure that projects are properly validated and controlled as they develop, data is extracted from the evolving building information model and submitted to the client at various milestones. This submission is described as a data drop or information exchange.

Generally, data drops are aligned to the project stages described above, and the information required reflects progress made at that stage. This might be considered analogous to a stage report on a conventional project. The nature of data drops should be outlined in a set of requirements at the beginning of a project. These may be considered to sit alongside the project brief: while the brief defines the nature of the built asset that the employer wishes to procure, the requirements define information about that asset to ensure that the design is developed in accordance with its needs and it is able to operate the completed development effectively and efficiently.

Typically, standard plans of work for buildings and infrastructure have accommodated these data drops. Critically, time and cost risks depend on the level of detail adopted at each stage of the Digital Plan of Work and Assemblies and decisions should be taken in this context (see Figure 1).

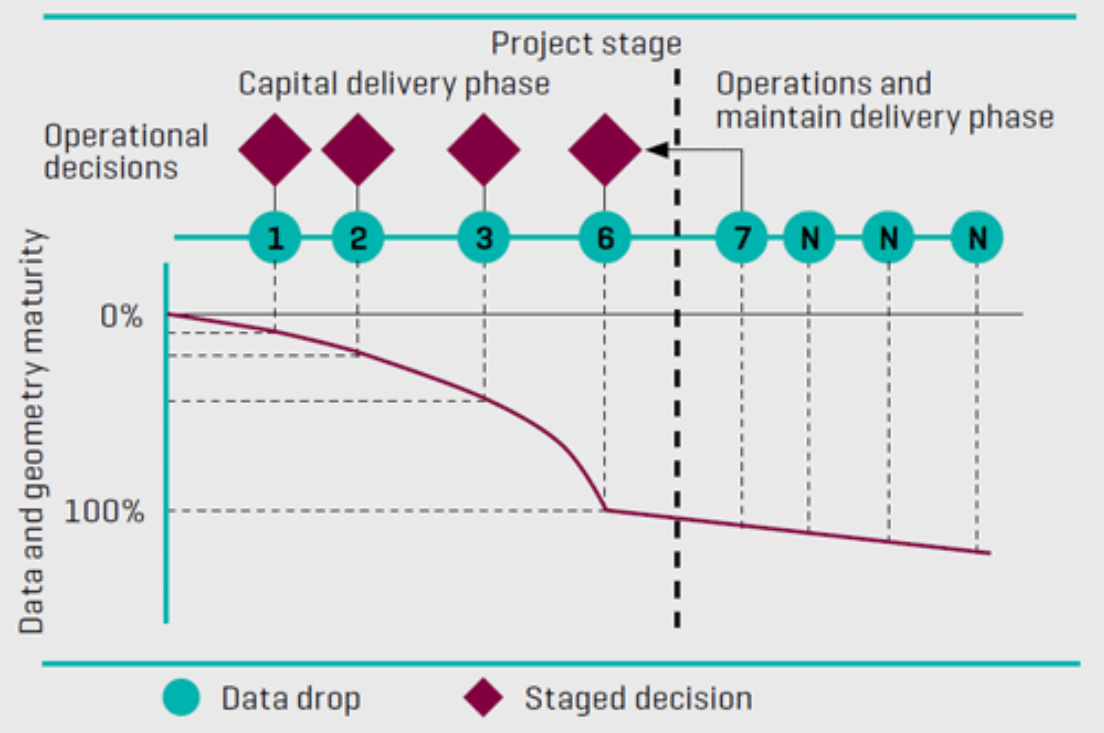


**Figure 1: Plan of work v level of detail**

*Source: The Digital Plan of Work and Assemblies, BIM Task Group*

## Standards spread

Business practices are increasingly demanding global rules, such as the International Financial Reporting Standards used in the accounting profession. As land and property together represent 70% of global wealth, measurement of space in property and construction costs are prime candidates for standards of their own.

*ICMS will be an essential global classification, allowing more consistent international use of building information models*

Such global standards would allow more consistent project decision-making using BIM across different markets, in turn enabling better benchmarking and greater transparency.

This is an important consideration, as there are difficulties in comparing the cost of construction projects on an international basis. Surveys of cost consultants in 40 countries by Building Cost Information Services (BCIS) and the European Council of Construction Economists have shown that:

- around 50% of countries do not have any published standard classification of

building parts
- in the absence of locally agreed standards, professionals frequently adopt foreign standards or ad hoc standards developed in house
- there is no common way of expressing cost per square metre, either in terms of the cost definition or the floor area
- in many countries the quality of cost information and data classification falls short of what local professionals might wish (2009 BCIS International Cost Elements Enquiry Report).

The BCIS report concluded that:

> 'Although there are countries with quite complete cost-related standards and information sources, there appear to be many more where the quality of published guidance and cost information falls short of what local professionals might wish.'

Reports from the World Economic Forum and the McKinsey Global Institute, Shaping the Future of Construction (2016) and Reinventing Construction (2017) respectively, emphasise this point. The first says the industry can be transformed by collaborative standards and 'the standardised definition of costs, classifications and measurements ... will lead to comparability and compatibility among projects'. McKinsey meanwhile maintains that poor productivity will be improved by 'encouraging transparency on cost and performance, as the [International Construction Measurement Standards (ICMS)] do'.

Progress on the ICMS has been good: the second public consultation concluded in May and the standard is on track to publish in July 2017.

## Classification and costing

The ICMS are intended to serve as a global framework for classifying and costing construction projects, and enable cost decisions to be made on the basis of the same measurements and definitions. Governments, clients and property and construction professionals can then talk the same language across sectors, disciplines, and even national boundaries.

ICMS will be an essential global classification, allowing more consistent international use of building information models. In turn, this will lead to better collection of data for both cost prediction and, ultimately, machine learning. As BIM, big data and smart cities begin to merge as concepts, standard classifications will assume an even more important role in making sense of the deluge of data.

ICMS will thus benefit financial institutions, investors, clients, consultants, contractors and the supply chain at a project level; governments, regulatory and standards-setting bodies and professional institutions at a national level; and financial institutions, investors, clients, consultants, NGOs and global professional institutions and umbrella bodies at an international level.

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## Further information

- ? Figure 1 source: The Digital Plan of Work and Assemblies, BIM Task Group
- See the ICMS Coalition website

- Related competencies include Data management , Procurement and tendering , Quantification and costing of construction works , Teamworking
- This feature is taken from the RICS *Construction journal* (June/July 2017)