A new dimension

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Sara Wilkinson reports on RICS research exploring the ?value dimension? in building information models

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Surveyors need good quality information about buildings, the surrounding environment and the market when preparing valuations. The management of information includes organising and reusing various built environment information sources.

Those who use building information modelling (BIM) claim client benefits of improved maintenance and record keeping through life as well as performance data. Defined as:

> 'a modelling technology and associated set of processes to produce, communicate and analyse building models',

BIM is a series of interlinked databases that can be shared and updated for design and construction tasks. 3D models have developed to incorporate 4D (time or workflow scheduling) and now 5D (cost data models).

The architecture, engineering and construction (AEC) sector developed BIM to manage data during the design and construction periods of the building life cycle. Over time, the opportunity for other professional groups to use data contained within, or linked to, BIM models has grown.

An RICS study has found there are opportunities to use BIM in valuation and also throughout the property life cycle.

Property and valuation involves the assessment of risk, growth and depreciation. The value of BIM for property is in the data required. BIM can describe building performance through the following phases: the commissioning, project execution, operations and maintenance, and recommissioning/disposal.

Studies have focused on AEC and have disregarded activities that lie upstream and downstream of design and construction. In a series of UK and Australian workshops with experienced property professionals, we enquired about the types of information needed to deliver professional services, where this information was obtained, and when the data was needed. The information was ranked in importance in respect of various tasks, including valuation.

The property life cycle

Surveys in the UK, US and Australia showed most clients believed that there was a positive return on investment when BIM was used; for example, when assessing sustainability in a

feasibility study, in respect of likely ratings under BREEAM, LEED or Green Star.

There is a value premium in sustainable commercial property in the three areas. By using BIM data and simulations, clients can be informed of the environmental, social and economic costs and benefits of these options, allowing them to make informed decisions, such as considering the impact on value.

In AEC projects, life cycle is defined as: pre-design (project feasibility), schematic design, detailed design, construction documentation, construction, and operation/maintenance. Clients are the only stakeholder involved but when development and property management activities are taken into consideration, a more extensive life cycle emerges:

- conception;
- planning and feasibility;
- preparation;
- execution;
- operation and maintenance;
- recommissioning.

Property information

The information types used by valuation surveyors fell into five categories:

1. market and location data;
2. property data describing plot of land;
3. property data describing economic information;
4. building information;
5. process qualities.

The information sourced, organised and (re)used by valuation surveyors (and also developers, property and portfolio managers, investment surveyors, valuers, property managers, facility managers and building surveyors) is shown in Table 1.

Categories of data for survey

- Market data
- National market data
- State, regional and neighbourhood market data
- Listings, recent sales, and auctions data
- Property transfers data
- Property marketing statistics

Property location data

- Macro location data
- Micro location data

Property site data

- Property lot attributes
- Utilities
- Environmental attributes
- Surrounding building context
- Property development details

Financi

al data

- Payments in
- Payments out
- Vacancy/letting
- Tenancy occupier data

Building data

- Spatial attributes
- 3D model objects (elements) and properties (parameters)
- Building documentation and images

Real estate data

- Property value attributes
- Property imagery
- Property activity
- Property insurance attributes
- Property insurance rate variables

Project data

- Planning and feasibility data
- Design management data
- Construction process
- Management data

Operations and maintenance data

- Maintenance, alteration and repair
- Asset monitoring and tracking
- Space management
- Information categories

Source: adapted Wilkinson & Jupp, 2015

This information is sourced from building documentation, consultants? reports, industry databases, building inspections, facilities managers, and documentation of the design and planning process typically created for compliance with regulations. Some is found in BIM and some is sourced from building management systems (BMS).

Each information type was mapped with development and property management activities, including valuation, to reveal what was used and when. Obviously there are challenges about the issues raised by practitioners, including inter-operability and information standards, information quality and fidelity, context, security and privacy, and digital skills and knowledge. Overall, the research found there is potential for some BIM data to be used by valuation surveyors, but also some information contained in BMS.

Different property professionals ranked the information types differently. Corporate real estate management professionals have repeated information needs over longer periods of the life cycle, whereas valuation surveyors need a more limited range of information at specific points, such as when the building is sold.

Although AEC focuses on the design and construction phases, this is being extended into the operational phase and the actual building performance falls within the domains of valuation. Professionals requiring building performance and maintenance cost data may find some BIM data useful. While, the number of existing buildings with BIM is relatively few, BIM-enabled property is more highly represented in high-quality newer commercial stock.

Technology use

When we asked RICS members what technologies and information sources they adopted, high use of intranets was reported, but 3D modelling systems, finance systems and 2D CAD systems were less used. The lowest used were building simulation and analysis, 4D and 5D modelling, virtual data room and BMS.

Overall, surveyors have adopted IT, while the advanced and newest iterations of BIM technologies are less familiar to the survey sample (see Figure 1). When asked about BIM, 12.1% reported 'no understanding', and 48.3% had 'limited understanding'. Less than a quarter, 24.1%, felt they had a 'good understanding' while 15.5% felt they had an 'excellent understanding'. Overall, 67% recorded 'no experience' of BIM, and only 12% reported experience of BIM exceeding five years (see Figure 2).
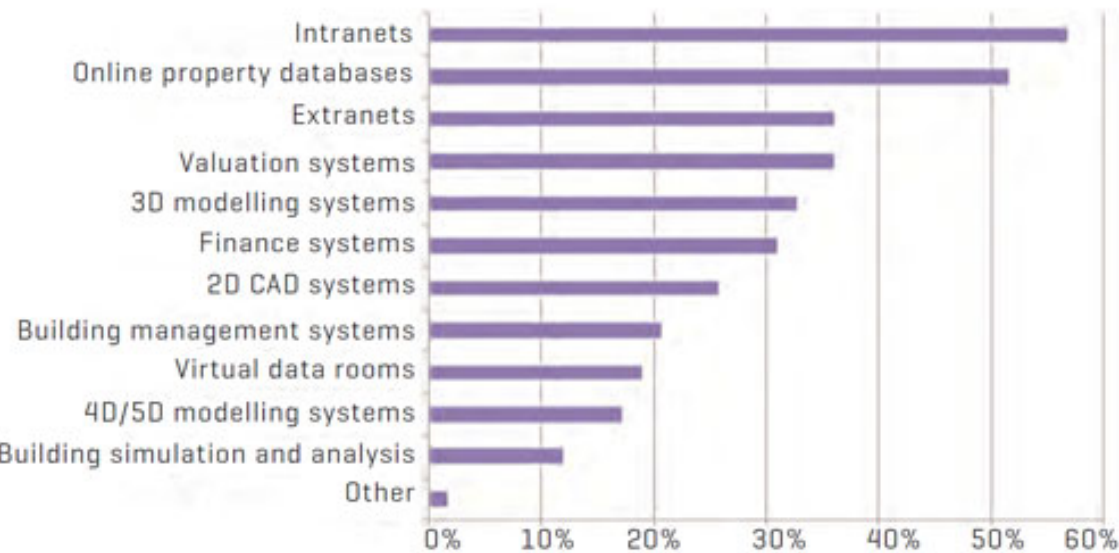

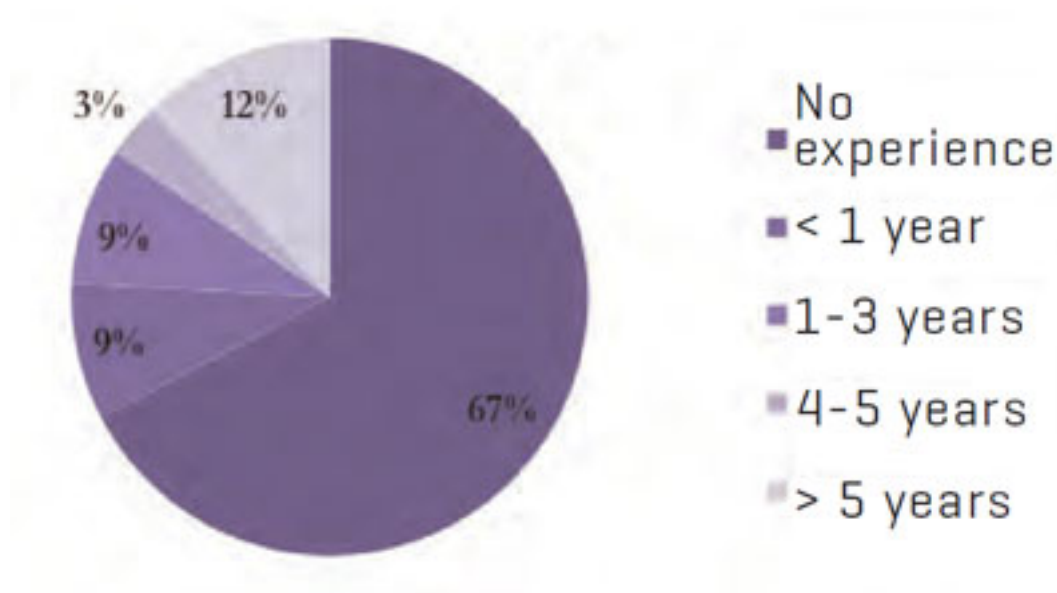**Figure 1: Information technologies used by surveyors**

Figure 2: Experience of BIM

Of those with hands-on experience, most received training on the job, followed by industry training courses, in-house training programmes and finally tertiary education. Where training is on the job, in-house and via courses, individuals are exposed to a limited range of systems and technologies.

This is understandable where there is a need to upskill the existing workforce. However, there is a greater potential in the education system for students to be exposed to the theories underlying the technologies and a greater range of systems. RICS is encouraged to promote the adoption of BIM education into its accredited global property education provision.

Conclusion

Overall, we found it is feasible for valuation surveyors to use some BIM information, especially that linked to the BMS in respect of actual building performance.

The benefits of using BIM or BMS information is more reliable and accurate information in valuations, although challenges prevail around accuracy and reliability as well as assurances that the information is current. Expanding access to BIM could enable some valuation surveyors to improve the quality and accuracy of their services.

BIM education programmes should be developed for property and BIM, competencies developed within the APC structure. RICS has established the first BIM Managers certification, for members in construction and some aspects may be transferable to a property-focused certification. Online education resources would raise awareness and knowledge. Provision of CPD events will allow practitioners to realise the potential of using BIM information. The numbers who could use BIM information is limited but it will grow.

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Further information

- Related competencies include <u>Measurement of land and buildings</u> , <u>BIM</u> , <u>Valuation</u>
- This feature is taken from the RICS *Land journal* (December 2015/January 2016)