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Exploring the value of BIM for corporate real estate

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1.0 Introduction and rationale for the research

Building Information Modelling (BIM) is said to be determining the way that architecture, engineering, construction and operation (AECO) professionals will work in the future (Macdonald, 2012). However the question is; *what opportunities are there for professionals, such as Corporate Real Estate Managers (CREM) to use BIM?* Commercial property professionals require good quality through-life information about buildings, the surrounding environment and the market. Furthermore, professional property services require access to, and use of robust and reliable data from many sources to deliver a complete view of performance and value during the building lifecycle. Thus effective information management across various property sectors includes the sourcing, organisation and reuse of a variety of built environment data and data sources. Whilst advocates for BIM claim client benefits include faster approvals due to clearer design intent and access to up to date data, the benefits and opportunities of BIM for stakeholders such as CREM has been largely ignored until now.

BIM is *'a modelling technology and associated set of processes to produce, communicate and analyse building models'* (Eastman et al, 2008), where intelligent 3D models allow data to be shared. The 3D model has developed to incorporate 4D (time, or workflow, scheduling) and 5D (cost) data. BIM can be viewed as a series of interlinked databases (typically represented graphically using models) that can be shared and updated for design and construction tasks. Each iteration is referred to as a 'D'; a dimension. When first learning about BIM, it is apparent there is a lexicon and language of BIM which is unfamiliar to those outside the BIM community. Part of the challenge for property professionals will be to learn and familiarise themselves with this new BIM language in order to understand it and use the data to their advantage.

Corporate Real Estate (CRE) is defined as real estate owned by corporations for use, leasehold or investment purposes. CRE comprises property that accommodates organisations activities, that can be owned as leasehold or freehold (Wills, 2007). CRE relates to the management of real estate (Heywood and Kenley, 2013) owned by a corporation either for investment or for its own productive purposes, and can include superannuation (pension) funds and property trusts (real estate investments trusts (REITS) and be in private or public ownership (Wills, 2007). There are various classifications and CRE can be classed as strategic property, landmark or flagship property, core property, peripheral property or surplus (or disposal) property. Property is characterised by three main characteristics; risk, growth and depreciation (Millington, 2014). The value of BIM for property is the information required during the assessment of the risk, growth and depreciation status of a property and provides a description of its performance through life. This lifecycle perspective includes original commissioning, project execution, operations and maintenance, and recommissioning / disposal. Whilst value has been addressed partly in the research literature relative to BIM's return on investment (ROI), this research has been at the level of the AEC project and has sought to understand value relative to participating project stakeholder organisations. As such these studies have largely neglected the broader processes of client-side stakeholders and the activities that lie upstream and downstream of design and construction (Wilkinson & Jupp, 2015). This research explored the potential value of BIM for CRE.

2.0 The characteristics of BIM and CRE

The lifecycles of complex, long-lived buildings mean that it is important for CRE professionals to have robust and reliable through-life information about performance and value. Whilst the value of BIM is addressed in research literature relative to its return on investment (ROI), these studies often centre on the project lifecycle and define value in terms of AEC interests.

In the last 5 year period over 250 articles have investigated the impacts of BIM relative to project performance and its impact on business value (e.g. Carroll 2009, Becerik-Gerber & Kensek 2010, Rowlinson *et al.* 2010, Sebastian & van Berlo 2010). Their definition of value focuses on project and/or an AEC business level outcomes. Many studies include client perspectives on the perceived benefits, costs and risks of new technological, process and organisational change. Industry surveys undertaken in Australia, the UK and US (McGraw Hill 2014) show most clients perceive a positive ROI when BIM is adopted. However, these studies are limited to the project lifecycle, and consider only single facility project processes neglecting the broader property perspective.

A number of studies covering the UK, Europe, the US and Australian/New Zealand AEC industries show that BIM uptake has been accelerating and is likely to accelerate over the next few years (McGraw Hill, 2014). In the US in 2009 half the industry was using BIM; a 75% increase in a two year period (Young *et al.*, 2009). A McGraw-Hill Construction report, 'The Business Value of BIM in Europe' (McGraw-Hill 2010), shows construction professionals in France, Germany and UK have been using BIM longer, but overall BIM adoption is greater in North America. The study shows that over a third (36%) of Western European construction professionals are using BIM, where previously McGraw-Hill found that 49% of contractors, architects and engineers reported BIM usage, (McGraw-Hill 2009). However, there is no clear and consistent demand for adoption by clients. Currently BIM adoption is largely in the larger AEC companies and within larger construction projects, buildings and estates. Furthermore given that typically only 1-2% is added to the total stock of buildings annually (Wilkinson, 2015), it will be many years before a majority of stock has BIM.

Over time it became clear that some common standards for BIM were required to facilitate greater reliability and easier exchange of data and the development of these standards are positive in respect of use of BIM by CREM. Open BIM is developed by buildingSMART, which has a family of corresponding standards that interact as well as publishing Industry Foundation Classes (IFC) and related buildingSMART data model standards (buildingSMART, 2016). Prior to 2010, end users of BIM who exchanged information within a BIM, had to exchange the entire BIM model. This inefficient method required recipients to compare different releases of the BIM model to filter the requests from senders and a more streamlined approach was needed. This need lead to the concept of the open standard to facilitate effective communication between different tools and, in 2010, Tekla and Solibri, software engineering companies, came up with an initial plan. Following this development, a task force was established in 2013 to develop the potential to exchange information more easily and, after a public review, a standard was adopted and released by buildingSMART in 2014 (buildingSMART, 2016). Further improvements are underway to increase data transfer as technologies evolve.

The IFC specification is developed and maintained by buildingSMART International as its "Data standard" and, since IFC4, it is accepted as ISO 16739 standard. The specification of the IFC standard includes: the IFC Specification html documentation (including all definitions, schemas, libraries), the URL for the IFC EXPRESS long form schema and the URL for the ifcXML XSD schema. These open BIM data model standards are developed by the buildingSMART Model Support Group, with the implementation activities coordinated by an Implementation Support Group. Together these groups organise an IFC software certification process (http://www.buildingsmart-tech.org/, 2016). Data Model Standards (Industry Foundation Classes) are officially published at this website and related standards, such as [BCF] and affiliated standards are hosted here as well. The other buildingSMART standards are the Data Dictionary Standard - International Framework for Dictionaries (IFD) and the Process Definition Standard - Information Delivery Manual (IDM) are linked.

El-Gohary (2010) argued that potentially, BIM can add value when assessing sustainability in a property development feasibility study, where the costs and the potential of different options can be assessed in respect of likely sustainability rating levels say, under BREEAM or Green Star. Studies by Fuerst and McAllister (2012) and Newell et al, (2011) have indicated that there is a value premium in sustainable commercial property in the UK, US and Australia. Using BIM data and simulations, clients can be advised of the social, environmental and economic costs and benefits of various options allowing them to make more informed decisions that optimise, or at least consider the impact on property value. However it is not known whether the information specified in AEC BIM models currently meets the needs of the property professionals.

3.0 The property life cycle and BIM

Property management and development activities encompass more than the combination of single or multiple AEC projects and the application of BIM in this wider scope of property services is not well understood. Typically, at the level of an AEC project, the general lifecycle process of the design and construction project is defined as:

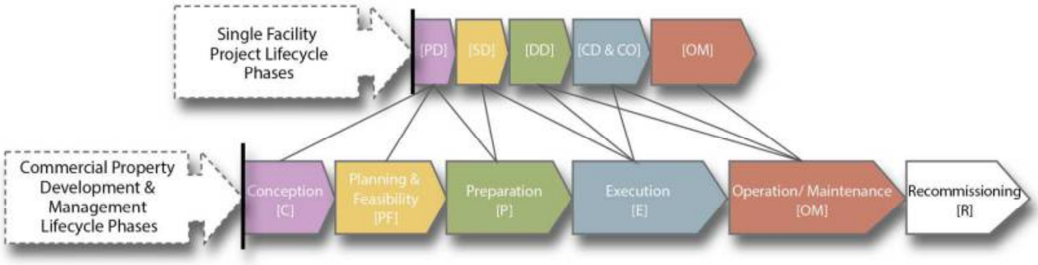
1. Pre-design (PD) in which the decision maker from the client side evaluates project feasibility;
2. Schematic Design (SD);
3. Detailed Design (DD);
4. Construction Documentation (CD);
5. Construction (CO); and
6. Operation/Maintenance (OM).

Only the client is involved in the entire process and other professionals join and depart from the project as required. When taking the wider property development and management activities that surround the AEC project into consideration, a more extensive lifecycle process becomes evident. This property perspective of lifecycle includes not only the AEC phases described above, but also activities that encompass property such as;

1. Conception;
2. Planning and Feasibility;
3. Preparation;
4. Execution;
5. Operation and Maintenance (O&M) and
6. Recommissioning (see Figure 1).

When the two different levels of lifecycle are compared, the requirements of information management is more complex and the opportunities to maintain and leverage the data contained within, or linked to, a BIM model is apparent. However there is a lack of literature reporting studies of well-defined property based or client-side strategy surrounding the business case for deploying BIM – either on single facility projects or relative to property portfolios.

Figure 1. Property Management and Development processes compared with Single Facility Project Processes (Source: Authors)



The recent increase in digital information generated during AEC projects and throughout a property's operation and maintenance creates potential for a new approach to information management within property. The development of new approaches must consider the lengthy time periods that information must be managed over and complexities surrounding the different consumers and generators of information, where information must be able to be accessed and used by numerous property professionals. The established role for BIM in managing information within AEC professions can be extended to property professionals. Questions arise such as; *what are the information needs, at what periods during the lifecycle is information needed* and; *what is the frequency of which such information is required?* In seeking to provide answers to these questions the first step was to identify and then make an assessment of relevant property data.

4.0 Corporate Real Estate Management

Corporate Real Estate (CRE) is defined as real estate owned by corporations for use, leasehold or investment purposes. CRE comprises property that accommodates organisations activities, which can be owned as leasehold or freehold. CRE relates to the management of real estate (Kenley et al. 2000. CoreNet Global 2007). Heywood and Kenley (2013) identified five core areas of CREM as; factor of production, corporate asset, investment, commodity, and public infrastructure.

Table 1 Five core areas of CREM and key trends (adapted Heywood and Kenley (2013)

CREM core areas	**Technical CREM practice** (Heywood and Kenley, 2008)	**Key trends** (Haynes and Nunnington, 2010)*
Factor of production	Holding practices (Lease structure alignment with business requirement) Measuring CRE expenses CRE accounting Location/Site selection Workplace styles IT purposes & Tools Metrics Benchmarking	Workplace transformation Multi-generational and diverse workforce ICT and real estate (impact thereon) Globalisation Change management Sustainability Real estate procurement (outsourcing) Lease-buy criteria (also Weatherhead, 1997)
Corporate asset	Holding practices Financing CRE – Corporate instruments Financing CRE – CRE instruments CRE to support the organisation (financially) Measuring CRE expenses CRE accounting Metrics	Real estate procurement (accounting standards) Lease-buy criteria (also Weatherhead, (1997)
Investment	Financing CRE – CRE instruments CRE to support the organisation (financially) Metrics	Lease-buy criteria (also Weatherhead, (1997)
Commodity	CRE to support the organisation (financially)	Lease-buy criteria (also Weatherhead (1997)
Public infrastructure	Location/Site selection Workplace styles	Multi-generational and diverse workforce

* This list omits their Strategic alignment, which can be considered a Managerial CREM practice

Given the technical aspects and key trends of CREM practice there appears to be some potential for data contained in the BIM to be of use to CREM and surveyors at various stages of the property lifecycle.

5.0 Research question, aims and methodology

The research question is: *what is the value of BIM for CRE?* This question is examined relative to the activities and professional services performed by CRE property professionals. For example, could BIM help increase property income yields, by providing better quality data on: minimising risk on investment returns; increasing capital growth; and managing and optimising deprecation? The research aims were;

1. to identify the data types CRE professionals use through the property lifecycle,
2. to evaluate the importance of for these data types, and;
3. to ascertain how information requirements compare with those of AECO project processes and the extent this data is generated in AEC focused BIM deliverables.

This research adopted a two-stage research design. The research had the characteristics of qualitative research in that it sought to investigate the potential for property professionals to use BIM data (Robson, 2002). To do this, it was necessary to ascertain and gain a deeper understanding of their information / data needs and the type of data required. The first stage of the research employed a Delphi approach, which seeks to aggregate the opinions of a panel of experts through successive rounds of questionnaires and interviews (Robson, 2002). The results from each round were collated and fed back to the panel anonymously and then the panel was asked to provide further comment. Two groups of diverse and experienced property professionals were invited to share their knowledge and experiences in real time, in Sydney and London, over three workshops. The scope of each workshop was as follows;

1: Identify the types of data that each of the professional groups use in daily activities and, the associated challenges of through-life information management,

2: Identify upstream and downstream data requirements related to professional property service tasks,

3: Analyse upstream and downstream data requirements relative to data characteristics, such as; quality and accessibility.

Stage two comprised an online survey of RICS members globally to ascertain more broadly whether the data needs identified in the Delphi groups and workshops were reflective of a broader range of property professionals.

6.0 Data collection and findings

The data sources used to provide a description and assessment of a property's performance and value are disparate, extensive, and correspond to the type and variety of professional AECO and property activities that span the building lifecycle. The data collected encompasses market, property, building, financial, project, operations and maintenance data. Together in various combinations and at different lifecycle stages, this data is reused by a variety of property professionals to inform performance and valuation tasks.

Property Information Requirements

A range of separate and distinct sources are used currently to access property and CRE management information. Distinct data types may coexist in isolation and the quality, completeness and accuracy of this information is often unknown and sometimes unchecked (by those who generate the information, or, who may consume it), making information management in property disciplines complex. Lützendorf and Lorenz (2011) identified a list of 22 descriptors to represent information types used by property professionals, shown below in Table 2.

Table 2 Property Descriptor Types (from Lutzendorf & Lorenz, 2011)

1. *Location* – National Market Descriptors
2. *Location* – Macro Location Descriptors
3. *Location* – Micro Location Descriptors
4. *Plot of land* – characteristics and configuration descriptors
5. *Plot of Land* – Surrounding Context Descriptors
6. *Economic Quality* – Market Descriptors
7. *Economic Quality* – Payments In Descriptors
8. *Economic Quality* – Payments Out Descriptors
9. *Economic Quality* –Vacancy / Letting Descriptors
10. *Economic Quality* / *Cash Flow* – Tenancy/Occupier Descriptors
11. *Building* – Basic Building Quality Descriptors
12. *Building* – Technical Quality Descriptors
13. *Building* – Functional Quality Descriptors
14. *Building* – Environmental Quality Descriptors
15. *Building* – Design / Aesthetics Quality Descriptors
16. *Building* – Urban Quality Descriptors
17. *Building* – User Health / Comfort Quality Descriptors
18. *Building* – Cultural Value Descriptors
19. *Building* – Brand Value Descriptors
20. *Process Quality* – Planning Descriptors
21. *Process Quality* – Construction Descriptors
22. *Process Quality* – Management Descriptors

Their sources included The European Group of Valuers Associations (TEGoVA 2003), RICS (2009) sustainability assessment schemes such as the United Nations Environment Programme (UNEP 2009), and the Green Property Alliance (GPA 2010). These studies were examined to ascertain whether BIM might offer data for property development and management activities. The researchers analysed each information requirement relative to the scope and processes identified in Figure 1 and developed an information requirements framework consisting of five main types of property, development and management descriptors, 25 sub-types and 90 attributes. Five categories of information relevant to property and CRE management were;

(1) Market and Location Data,
(2) Property Data describing Plot of Land,
(3) Property Data describing Economic information,
(4) Building Information, and;
(5) Process Qualities.

These information types are shown in the second column of Table 2. The classification developed in Table 2 was compiled on the basis of information traditionally sourced, organised and (re)used by property developers, property and portfolio managers, property investment surveyors, valuers, property and facility manager, building surveyors and in property transactions. This data can be sourced from building documentation, consultants reports, industry databases, building inspections, facility managers, a variety of building reports, and documentation of the design and planning process typically created during the design and planning stage for verification of conformity with regulations. Each information type was identified based on its mapping with property development and management activities and its classification as either an economic, environmental or social indicator of value.

Table 3. Information Categories for Workshops and Survey.

Information types identified for workshops (Adapted from Lutzendorf & Lorenz 2011)	**Categories of data defined for survey** (Based on the Workshop Outcomes)

1. Location Information Types, including: National Market Data Macro Location Data Micro Location Data	**1.Market Data including**; National Market Data State, Regional and Neighbourhood Market Data Listings, Recent Sales, and Auctions Data Property Transfers Data Property Marketing Statistics
	2.Property Location Data; Macro Location Data Micro Location Data
2. Property Information Types, describing Plot of Land, including: Characteristics and Configuration, Surrounding Contextual Data)	**3.Property Site Data including;** Property Lot Attributes Utilities Environmental Attributes Surrounding Building Context Property Development Details
3. Property Information Types, describing Economic and Financial Data, including: Payments In, Payments Out, Vacancy/Letting Tenancy/Occupier Information	**4 Financial Data including;** Payments In, Payments Out, Vacancy / Letting and Tenancy Occupier Data
4. Building Information Types, including: Building design information Technical and building systems information Functional information, Environmental design information, Design/ Aesthetics information Contribution to urban quality User comfort & Post-occupancy evaluation information Cultural value information Image and reputation value information	**5. Building Data, including:** Spatial attributes 3D model objects (elements) and properties (parameters) Building Documentation and Images
	6. Real Estate Data (Added to incorporate data typically collected that describes intangible value descriptors), including: Property Value Attributes Property Imagery Property Activity Property Insurance Attributes Property Insurance Rate Variables
5. Process Information Types, including: Planning process information Design process information Construction process information Operations and Facilities Management information	**7. Project Data, including:** Planning and Feasibility Data, Design Management Data Construction Process and Management Data
	8. Operations and Maintenance Data, including; Maintenance, Alteration and Repair, Asset Monitoring and Tracking, Space Management

(Source: Adapted Wilkinson & Jupp, 2015).

These characteristics formed the basis of phase 1 workshop discussions and were modified to cover a wider range of property activities and re-structured according to information formats that are readily available throughout the property lifecycle, and finally re-worded into language familiar to property professionals. The final categories developed for the survey (phase 2 of data collection) are shown in the second column of Table 2.

Sourcing data from BIM technologies and building management systems (BMS) is becoming more common in the delivery and operational stages of commercial buildings (McGraw Hill 2014). Thus the same information management capabilities that are being derived from a BIM-enabled approach to benefit AECO stakeholders can be extended to serve CREM property professionals and add value to their services.

With the data generated, it was necessary to evaluate the relevance and importance of each data type. A method for identifying and determining the importance of information types was developed. The first step prioritised information based on the need, frequency of use, the effort of reacquisition, and finally, duration of reacquisition. Modifications of this method were used to analyse the workshop and survey findings.

Workshop participants brainstormed the challenges relating to through life information management and then ranked them. 23 challenges were identified, that are divided in technology based and socio-technology challenges shown in Table 4. Participants used workbooks and Post-it notepads to record responses. Group discussions were recorded and facilitators and scribes took notes. All data captured from the workshop was analysed using thematic analysis. To confirm agreement between workshop participants on the significance of the information types identified according to each professional group, a three-point Likert scale was used, where 1 equals least important (irrelevant) and 3 equals most important (essential) and were analysed by calculating the Relative Importance Index:

$$RII = \frac{\Sigma W}{AxN}$$

where *W* = weight given to response, *A* = highest weight, and *N* = number of respondents.

The relative importance index (RII) for all 23 challenges were calculated for all participants, and then calculated according to each type. The 23 challenges were arranged in descending order of relative importance according to all participants and ranked. The highest RII indicates the most important information types with rank 1, the next indicating the next most important with rank 2 and so on.

Table 4. Challenges to through-life information management and corresponding RII

TYPE	SUB TYPE	CHALLENGES
Technology based Challenges	**Inter-operability & Data Standards**	1. Ensuring data to be compatible and interoperable over long timescales (RII 0.90) 2. Ensuring data can be sustained and updated over long timescales (RII 0.85) 3. Ensuring data can be organised such that it can be discovered and exploited (RII 0.92)
Socio-Technical Challenges	**Data Quality & Fidelity**	4. Human error, information overload and cognitive limitations (RII 0.77) 5. Data consistency, accuracy and reliability (RII 0.92) 6. Data granularity and its consistent specification (RII 0.81) 7. Data verification and validation (GIGO – Garbage in, Garbage out) (RII 0.85)

	Context-based Issues	8. Degree of interpretation and human manipulation (RII 0.85) 9. Communication differences and difficulties between domain specific languages (RII 0.74) 10. Number of disparate data sources and disjointed nature of information flow (RII 0.87) 11. Differences in levels of availability of data between stakeholders through-life (RII 0.54) 12. Compressed timeframes for data generation, sourcing and analysis (RII 0.56)
	Security & Privacy	13. Conflict in interests relative to data transparency and business interests (RII 0.74) 14. Confidence in IT infrastructure security in distributed networks & data stores (RII 0.81) 15. Privacy preserving analytics and granular access control (RII 0.82) 16. Secure data storage and data provenance (RII 0.81) 17. Intellectual property and information ownership (RII 0.90) 18. End-point validation and filtering (RII 0.82)
	Digital Skills & Knowledge Competencies	19. Lack of digital skill sets and domain knowledge (RII 0.85) 20. Complexity of incorporating operational simulations (RII 0.62) 21. Perceived 'black box' and risk in loss of knowledge due to dynamic workforce (RII 0.54) 22. Need for cultural change amid feelings of fear & 'loss of control' (RII 0.73) 23. Continual reporting and justification of business case for on-going data collection (RII 0.72)

(Source: Wilkinson & Jupp, 2015)

The challenges identified by each group were then discussed. Five categories (Table 4) identified by the facilitators and reported back to participants include issues surrounding:

(1) Inter-operability and data standards,
(2) Data quality and fidelity,
(3) Context,
(4) Security and privacy, and;
(5) Digital skills and knowledge competencies.

Post workshop analysis further classified these five categories in terms of 'Technology based Challenges' (category 1) and 'Socio-technical Challenges' (categories 2-5). Far more socio-technical challenges (20 in total) were identified as being significant by participants. Participants were then asked to rank the importance of each of the 23 challenges. Table 4 illustrates the results of RII analysis.

The key findings are that there is potential for BIM data to be used by CREM. In respect of the research aims this study finds CREM professionals undertake a range of professional tasks through the building lifecycle and participants use a total of 24 data types in the five core areas of CREM and technical CREM practice as identified by Heywood and Kenley (2008) and listed in Table 5 below.

Table 5. CREM Professionals data types used

1. Building Description 2. Health & User Comfort 3. Tenant & occupier Situation 4. Functional Quality 5. Payments In 6. Construction Quality 7. Land Features 8. FM Quality 9. Surrounding Characteristics 10. Technical Quality 11. National Market 12. Design/Aesthetic Quality	13. Payments Out 14. Market & Letting Vacancy Situation 15. Design Process Quality 16. Site Features 17. Planning Quality 18. Macro-Location 19. Environmental Quality 20. Micro-Location 21. Cultural/Image Value 22. Operational Quality 23. Environmental Context 24. Urban Design Quality

When different property professionals ranked the importance or need for these data types for property different profiles emerged. Different data types were required at different stages of the property lifecycle. CREM professionals have repeated data needs over longer periods of the lifecycle, whereas others, such as Building Surveyors had a need for a more limited range of data types at specific points in the lifecycle, for example, when a Technical Due Diligence report is needed.

When information requirements are compared with those of AEC project level processes and the extent this data is generated in AEC focused BIM deliverables, AEC projects focus on design and construction phases, although this is being extended into the operational phase and this falls within the field of CREM. These property professionals who require data relating to building performance and maintenance costs for example, will find BIM data useful, where it is available, in their professional practice. The number of existing buildings with BIM, as a proportion of the total stock is very small, however BIM enabled stock is more highly represented in higher quality new commercial property typically managed by CRE. One note of caution is that there are technical and social challenges also with BIM that CREM needs to take into account, namely; inter-operability and data standards, data quality and fidelity, context, security and privacy, and; digital skills and knowledge competencies. CREM will need to be mindful of these aspects when using BIM data in their professional practice.

7.0 Conclusions

This preliminary research has shown that there is a place for BIM and CREM and that this will grow over time. In addressing the research question; *what is the value of BIM for CRE?* It is clear there is great potential to expand the current use of BIM data for property professionals, for example linking data held in Building Management Systems (BMS). CREM professionals currently 24 different types of data in their professional practice (see Table 5) and some of this data is found within BIM. There is potential to expand the range of data linked to BIM for use by property professionals such as CREM. A limitation of this pilot study is that only one or two CREM professional tasks were profiled to ascertain whether data within BIM would be useful to them. Therefore the next step is to undertake a comprehensive mapping of data needs and types across CREM to identify (a) what is currently within BIM that could be used, and (b) data needs and types currently in a digital format but found in databases outside of BIM that could be easily made compatible to BIM. In addition this review would identify those data needs and types that are outside of BIM that could be digitised and incorporated due to the extent of potential usage within CREM. The full list should be categorised and prioritised, and where necessary, negotiations with third parties should be initiated. In particular details on data source, format, and quality, with respect to reliability and accuracy, are needed. Furthermore reliability and accuracy of data are ongoing concerns for practitioners and third parties, who may use this data on which to base their professional advice to clients.

A further aspect is to develop education programmes where property students learn about BIM. At the professional body level, BIM competencies should be developed appropriate to property disciplines within the training structure so that property professionals can obtain recognition for skill and capability with the application of this knowledge in their professional practice. The Royal Institution of Chartered Surveyors has established the first BIM certification BIM Managers, for members in the construction sector, and there may be some aspects that may be transferable to a property-focussed certification. For existing practitioners provision of online education resources is needed to raise awareness and knowledge in respect of BIM and how property professionals could use data within the models. Finally continuing professional development events will allow practitioners to realise the potential of using BIM data in their professional practices. Once these aspects are in place, the value of BIM will be available to a wider range of professionals whose practice will be more accurate, more reliable and of greater value to clients.

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