

# **AN APPRAISAL OF THE PROTOCOL THAT WAS PUBLISHED BY THE CONSTRUCTION INDUSTRY COUNCIL (CIC) TO FACILITATE THE USE OF BUILDING INFORMATION MODELLING (BIM) ON PROJECTS**

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The UK Government has mandated using Building Information Modelling (BIM) Level 2 by 2016; however a deficiency in standard frameworks to manage BIM implementation and overcome its associated legal risks could make this planned scheme struggle. Therefore, in February 2013, the Construction Industry Council (CIC) released the first edition of its BIM protocol which provides a legal framework intended to promote the use of BIM level 2 on construction projects. This paper carries out a critical appraisal of the CIC protocol to find out whether it will facilitate BIM use, and therefore, accelerate the uptake of BIM adoption across the industry. An overview of the CIC protocol content is provided, along with a review of its benefits and difficulties of use. Additionally, this paper undertakes an evaluation of the protocol performance regarding its ability to overcome the legal issues facing BIM implementation. The assessment was carried out through conducting interviews and circulating questionnaires among construction professionals. It has been found that the CIC protocol is somewhat successful in managing BIM contracts, and the protocol seems to provide an average performance in overcoming the legal issues associated with BIM implementation. This suggests that the CIC protocol will be fairly useful for accelerating BIM uptake.

Keywords: building information modelling (BIM), BIM level 2, BIM protocol, contracts, intellectual property (IP).

## **INTRODUCTION**

In February 2013, the Construction Industry Council (CIC) issued the first edition of its BIM protocol. This is a legal document that has been designed to stimulate the collaboration between project parties in order to facilitate the use of BIM on projects (RICS, 2013). The protocol has been formulated to support Level 2 BIM projects, in line with the Government's requirements to use at least Level 2 BIM on all public projects by 2016 (Out-Law, 2013a).

This paper analyses the CIC protocol and discusses the issues connected with its use, including an evaluation of its benefits against the legal barriers facing the adoption of BIM. Carrying out this critical appraisal is essential for overcoming the legal and contractual challenges, because finding out how successful the use of this framework is will decide how successful the implementation of the BIM strategy will be. Lowe

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and Muncey (2009, p. 1) suggest that construction professionals ignoring standard frameworks forms the greatest challenge to undertaking BIM in the United States. Therefore, an assessment is provided in this study for the CIC protocol to consider how successful it is in facilitating BIM use in the UK.

## **THE RESEARCH METHODS USED**

Both primary and secondary research was carried out as part of this study. The primary research data was obtained by conducting several interviews and circulating a questionnaire online between 32 professionals representing different sectors in the UK construction industry. The questionnaire was designed and structured to measure the attitude of the UK construction professionals towards the release of the CIC protocol and the benefits that would be obtained from using such a protocol, whereas the interviews were undertaken to review some critical points about this protocol and to discuss the possible effects of its publication on projects involving BIM processes. The lack of professionals who fully understand the CIC protocol was the reason why the questionnaire was designed to rely on data quality not quantity.

The data required for the secondary research was collected from existing sources of information. This included books, construction journals, online sources, and reports to extract thorough and detailed information on the benefits and difficulties that may be associated with the use of the CIC protocol, despite the fact that not much of sources are available on this basis, because the protocol has not been officially used on projects so that its benefits and problems of use can be discovered in more detail.

## **LITERATURE STUDY**

This section firstly provides background information on BIM and the main legal issues surrounding its implementation across the UK construction industry, along with a brief review of the CIC BIM protocol. Secondly, the possible benefits obtained from using the protocol are identified and critically analysed. Finally, the protocol is examined for areas of possible legal gaps and disputes.

### **Background information**

Building Information Modelling, is defined according to the US National Building Information Modelling Standard (NBIMS-US) as "*a digital representation of physical and functional characteristics of a facility creating a shared knowledge resource for information about forming a real and reliable basis for decisions during life-cycle, for earliest conception to demolition*" (Fallon & Palmer, 2007, p. 2). Klein (2012, p. 2) has defined BIM as a tool which can be used to improve the efficiency of delivering a project and providing superior management of its constructed facility. According to Alan Barrow, president of the Institute of Civil Engineering Surveyors (ICES), BIM is a method of information management which enables everybody that engages in any project's different phases such as, planning, designing, constructing, operating, maintaining and demolishing to collaborate successfully and work in harmony (President's Column, 2013, p. 5).

In 2011, the UK Government published a report entitled "*Government Construction Strategy*". This report described the aim to reduce construction costs by up to 20%. Several objectives were set in pursuit of this aim. The main objective was to adopt at least Level 2 BIM (including all project documents, information assets and data exchange procedures) for all public projects by 2016 (Cabinet Office, 2011). The Government's BIM adoption plan was enshrined in a strategy report for the

Government Construction Client Group written by a joint Department for Business, Innovation and Skills and industry working party (BIM Working Party, 2011 cited in Klein 2012, p. 2). Contract and legal issues were identified in this report as potential inertia factors that could hamper the adoption of BIM (Udom, 2012b). Thus, the report recommended developing standard protocols and service schedules to set out requirements for project delivery, and to also facilitate the response of the supply chain to BIM strategy (Department for Business, Innovation and Skills, 2011, p. 20).

The development of a protocol which manages BIM processes and contractual responsibilities requires examining the legal and contractual barriers facing the adoption of BIM. Udom (2012a) notes that issues related to Intellectual Property (IP) rights, data corruption and model management are considered the main issues surrounding BIM implementation. In addition, Lewis (2012, p. 47) has written that, while BIM at Level 2 addresses concerns to design input, restrictions on liability and model ownership, a comprehensive and workable contractual framework is needed to manage data exchange and assign the roles that indicate who does what and when. Glover (2013, p. 13) suggests that the BIM protocol must form the contractual framework to manage BIM implementation, clearly indicating the obligations of project parties, needs to be incorporated into project contracts such as the NEC and the JCT Public Sector Supplement.

### **An overview of the CIC protocol**

The CIC protocol, which was published in 2013, is a fairly succinct document consisting of only eight clauses. These clauses provide users with the terminology, obligations and roles required for establishing a collaborative environment in which project information is properly shared to implement BIM processes. The protocol's declared objective is to "enable the production of Building Information Models at defined stages of a project" Rock (2013). The protocol defines the role of information management and assigns it to the information manager who is responsible for controlling and managing data exchange processes on projects. It also includes a provision giving it priority over other project documents in case of any inconsistencies.

Two appendices are attached to the CIC protocol. Appendix 1 is the Model Production and Delivery Table (MPDT). This table assigns responsibility for models provision and also discerns the levels of detail required at each project stage to build effective BIM models. Appendix 2 is the Information Requirements (IR) document, which defines how BIM models should be created.

### **The benefits intended to be obtained from using the CIC protocol**

Releasing this protocol, and the suite of BIM documentation and standards, has helped the Government to move forward with its strategy. According to Office Insight, (2013), *"The widespread adoption of Building Information Modelling (BIM) in architecture, design and construction has moved closer with the publication by the Construction Industry Council (CIC)"*. Chris Hallam, an infrastructure law specialist, also explained that, *"the CIC's new Protocol is a great step forward for widespread BIM adoption in the UK and is to be welcomed"* (cited in Office Insight, 2013). Khalid Ramzan, who is another infrastructure law specialist, added in regards to the publication of this protocol *"it is a clear step forward and should accelerate the up-take of BIM across the UK construction industry, particularly on public sector projects."* (Out-Law, 2013b). Additionally, David Philp, the Government's head of BIM implementation, said in the BIM Show Live conference that the publication of

the CIC protocol has changed the Government's focus from setting up processes by which BIM adoption is enabled to steering an actual implementation of BIM across the industry ("*BIM Makes Real Progress as Focus shifts to implementation*", 2013). Although Malone (2013) cautions that "*standardisation of information protocols will prove challenging, and aligning project team behaviours even more so*".

The protocol is considered to be an essential document, as it provides the legal framework which could facilitate and encourage the use of BIM on projects (Construction Industry Council, 2013, p. 7). The protocol has been formulated to make it easier for construction organisations to adopt BIM processes through facilitating collaborative working methods in project teams, and functioning within common standard forms of contracts (Out-Law, 2013c; RICS, 2013). It has been designed to fit into existing construction contracts such as NEC3 and JCT using a simple amendment (Out-Law, 2013b; Shilvock, 2013). It contains the text of a template which enables simple amending of contract provisions, and it also includes terms which could easily adapt the NEC3 contract conditions (BIM Task Group, 2013; NEC, 2013, p. 4).

Moreover, the protocol provides support for the production of deliverables for data drops at certain project stages (Dla Piper, 2013, p. 3). Specific obligations, liabilities and constraints connected with the use of BIM models are stated in this framework (The Construction Index, 2013), and the protocol also deals with parties' liabilities in relation to data sharing, copying, using or modifying. Additionally, it makes changes to the protection of the Intellectual Property (IP) generated on projects, and also to the licensing of third party material (Out-Law, 2013c). IP rights are protected under the protocol through granting short-term licenses for the employer and other members of the team, allowing the use of the IP created only for the permitted purposes. This licensing provides project team members with access to the produced models. However, the licenses granted would not be final or continuous, or subject to change, unless the right sub-licensing is obtained (Ho, 2013).

### **The legal issues and difficulties associated with the protocol use**

Part 1 of the "*BIM Legal Roundtable Discussion*" (2012), entitled "*Overview of the BIM Protocol and the Role of the Information Manager*" highlighted the following poor points in the CIC protocol:

- **Reliance on Data:** BIM models might become corrupted as they pass between project team members. This corruption, which could have a great impact on conflicts between parties, is unlikely to be detected by the protocol users.
- **Intellectual Property (IP) Rights:** No fundamental changes are provided for IP licensing under the protocol. Licensing is left to project parties to deal with it in the main contract. However, short-term licenses are granted under the protocol to ensure an adequate use of the IP created.

Although the protocol makes it easier for organisations to acquire the rights to use material (electronic data) in particular circumstances, it makes it harder for firms to preserve absolute control of their IP rights (BIM Journal, 2013). Despite the large inducement created under the protocol for companies to share IP on projects, no absolute protection is provided for IP creators, because once the employment of a project team member is terminated, the protection provided for their IP is ended. This allows other members, who might be rivals, to access, adjust and use their IP for project purposes with no need to make payment, which would cause problems for developers and operators across the industry (Out-Law, 2013c).

Moreover, the protocol's design does not seem to satisfy all the needs. According to Out-Law (2013a), locking the use of the protocol into BIM Level 2 will not fulfil the needs of those intending to use more sophisticated levels of BIM, and therefore the protocol use will be limited, although this locking is intentional and essential to adhere to the BIM strategy requirements. Further, the protocol was designed to mainly rely upon the input of the details provided by BIM skilled experts. Therefore, projects' employers should thoroughly review the protocol to make sure that its use will successfully deliver their projects' intended results (Hallam and Ramzan, 2013).

## **STUDY RESULTS AND DISSCUSSION**

This section presents the results obtained from doing the interviews and circulating the questionnaire to emphasise professionals' views regarding the protocol's ability to promote BIM implementation across the construction industry.

### **Interview results**

The eight interviewees, who were working in different sectors of the construction industry, highlighted the following points about the CIC protocol:

- The protocol seems to be well written. However, appendix 1 (the MPDT) is too simple and does not fully meet the purpose for which it was drafted.
- Regarding the role of information management, the person who performs this role should fully understand the whole process of BIM, as the information manager should not be the 'postman' who only sends and receives information. He/she should be the person who coordinates the process of building the BIM models.
- Overall, the protocol seems to promote the uptake of BIM through giving a standard form to start with.
- It does not relieve issues associated with Intellectual Property rights very efficiently.
- It needs to be used extensively in complex projects, so that judgements can be made on its use and benefits.
- Publishing this protocol seems to be a step in the right direction. However, the protocol is not one size fits all.
- Publishing this protocol will promote BIM implementation, as it seems to meet the requirements of the Government's strategy.
- Drafting and publishing this protocol is a step forward in BIM implementation. It certainly promotes BIM adoption, as it provides something to point at.
- This protocol deals with data exchange, which is the core of BIM process.
- A step forward with BIM uptake could be made through drafting and publishing documents like the CIC protocol, as people need a standard to guide them. They need something concise to let them know what to do, how and when.

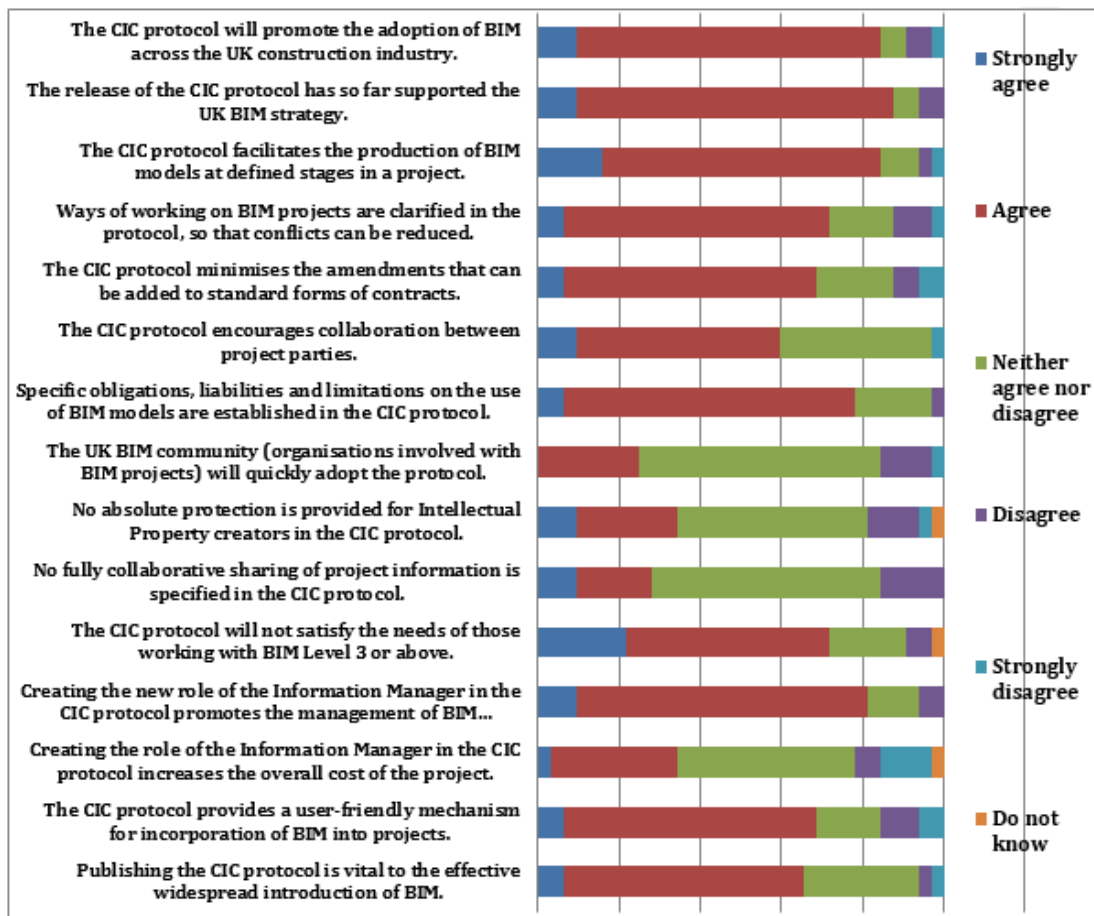
### **Questionnaire results**

The results shown below were collected from 32 professionals who were from various sectors in the construction industry including lawyers, contractors, managers, engineers and architects. These respondents took part in this survey to critically appraise the CIC protocol and discuss its ability to manage BIM projects, with the aim of identifying its potential benefits of use and challenges.

*The protocol's overall performance*

As shown in figure 1, most respondents agreed that the CIC protocol will support BIM uptake and facilitate its implementation on projects. It provides a user-friendly document that facilitates the production of BIM models and encourages collaboration between parties by setting specific obligations, liabilities and limitations in relation to creating and using these models. However, the respondents mentioned that the design of the protocol would only work with BIM Level 2 projects, and will not meet the needs of those looking to engage in more advanced levels of BIM. Equally, they were unsure whether it provides absolute protection of the Intellectual Property created on BIM projects, or whether it gives sufficient support for the collaborative working methods necessary for the sharing of information required on these projects.

Figure 1: The overall performance summary of the CIC protocol based on respondents to the survey



*Effective contractual framework*

Over half the respondents agreed that the protocol will succeed in providing an effective contractual framework to manage BIM projects. This indicates the potential the protocol has to successfully support Level 2 BIM projects and, in doing so, aid the Government's strategy.

*Terminology*

Most professionals ranked the ease with which the protocol terminology can be understood as moderate. This is an encouraging point, as the easier it is to understand the protocol terms, the more likely it will be accepted and used across the industry.

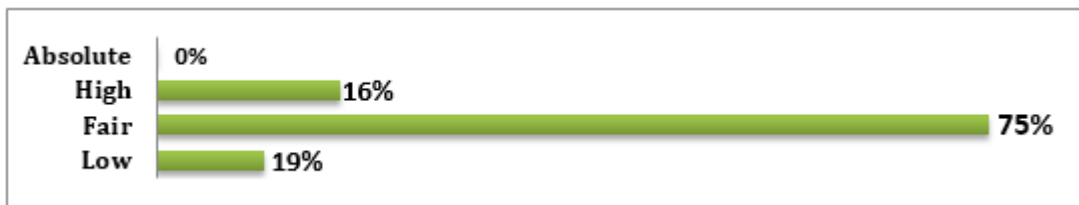
### *Effectiveness in addressing legal issues*

The protocol aims to overcome the legal issues connected with BIM implementation. These include concerns such as model ownership, liability for data accuracy and Intellectual Property rights. The protocol's effectiveness in addressing the legal issues surrounding BIM implementation was considered by over three quarters the respondents as being average.

### *Protection of intellectual property (IP)*

Most respondents expect fair protection to be provided for IP creators under the CIC protocol (See figure 2). The protocol secures IP rights through granting short-term licenses for the employer and other members of the project team, allowing the use of the IP created only for the permitted purposes.

Figure 2: Protection provided by the protocol for Intellectual Property



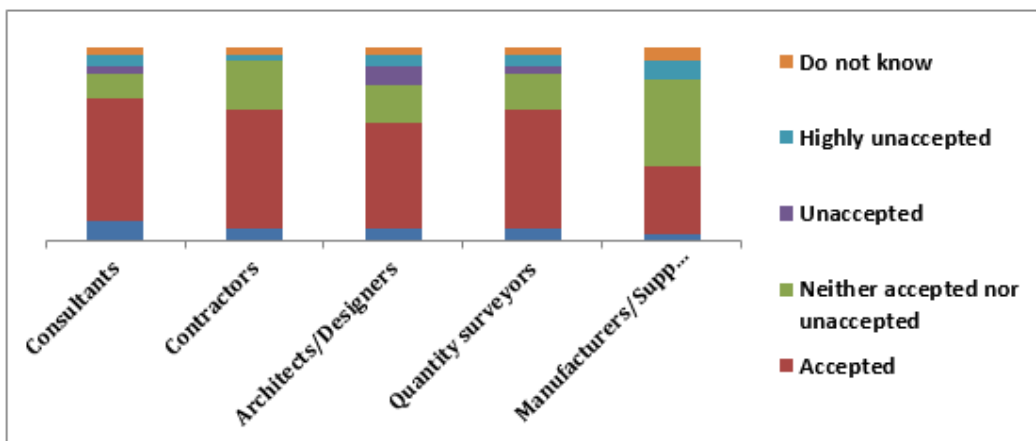
### *Support provided for sharing project information*

The majority of respondents expect average support to be provided by the protocol for data exchange. This is an assessment of the effort made regarding the liabilities, obligations, and constraints set in the protocol to manage data sharing, copying, use and modification.

### *Acceptance across the construction industry*

Respondents felt that various groups within the industry such as consultants, architects, quantity surveyors and contractors would accept the protocol (See figure 3). They think it will be successful in dealing with BIM issues, providing fair protection for IP creators, giving some support for data exchange and providing users with a framework which can be easily understood and successfully used for managing contracts involving BIM processes.

Figure 3: Acceptance of the CIC protocol across the construction industry



In addition to the above mentioned results, respondents indicated the following considerations about the CIC protocol:

#### *The protocol's benefits of use*

- Generally, the protocol is considered as a fairly simple document which provides the procedures required to manage data exchange on BIM projects.
- Legally, it is a universal framework which can be incorporated into common contracts with simple amendments. It also provides a step towards more sophisticated protocols.
- It is a standard document with a managerial concept.
- Technically, it suits the requirements for BIM Level 2, as it overcomes most of the issues associated with this level.
- The protocol guides the design team to the way in which it meets the employer's requirements and fits the project's needs.

#### *The protocol's legal gaps and problems for use*

- Designing the protocol to depend on the underlying contract to set the parties' main obligations might be considered as a legal gap.
- The parties' obligations, which are set in the protocol to manage the role of information management, might be considered excessively weak.
- Technically, the way with which the protocol deals with Intellectual Property issues does not seem to be fully comprehensive.
- The protocol is not appropriate for all BIM projects, as it was designed to be only used with Level 2 BIM projects, and also because it does not look to support truly collaborative working methods.
- Legally, the protocol cannot be easily controlled, because it is too process-driven. Additionally, the technical information required to fill the protocol's appendices should be adequately addressed and thoroughly defined before use, otherwise, these appendices will be useless.

## **CONCLUSION**

The CIC protocol has been analysed using the data obtained from reviewing literature, conducting an online survey and undertaking personal interviews. The literature study has indicated that a step forward has been made with BIM implementation since this protocol was released. This publication has provided a document which can be incorporated into standard contract forms with simple amendments, and can also clarify the roles, liabilities and obligations required to establish a collaborative platform in which BIM processes can be implemented. Other benefits, extracted from the online survey results, indicate that this protocol can facilitate the production of BIM models through encouraging the adoption of collaborative modes of working, and clarifying the work sequences required to be established at each project stage. The survey has also concluded that reasonable protection will be provided by the protocol for the Intellectual Property created. It also concludes that the protocol will be somewhat successful in managing BIM contracts. Additionally, the ease of the protocol's terminology was considered to be moderate, and the protocol's support provided for data exchange, and the performance given to overcome the legal issues surrounding the implementation of BIM Level 2 were both considered to be average. The result of the interviews indicates that using the protocol will accelerate the uptake of BIM adoption across the industry, considering all the benefits that can be gained from its use.

On the other hand, some problems and legal issues are considered to be associated with the CIC protocol use. The literature study indicated that if a failure has occurred



in the data exchanged between parties, it will not necessarily be observed by protocol users. Additionally, problems of Intellectual Property (IP) infringement might arise from using the protocol, as the IP of a team member may be accessed by others in the team even after this member's agreement is terminated. The survey results have also highlighted some legal gaps and problems associated with the protocol use. These include the weakness of the protocol's obligations in regard to dealing with the role of information management, the simplicity of the protocol's model delivery table, which might not fully fulfil the aim for which this table was designed, and also the protocol's inappropriateness in dealing with contracts involving advanced levels of BIM (beyond Level 2), which might limit its use.

To sum up, despite the problems that might be associated with its use, the CIC protocol has the potential to be fairly successful in dealing with BIM implementation issues (For example: IP rights, collaboration among parties and data exchange). Additionally, releasing the protocol seems to be facilitating BIM uptake, as a step forward with BIM adoption has been taking place since this legal framework was issued.

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