American University Business Law Review

Volume 13 | Issue 2 Article 6

2024

Constructing Solutions: Addressing Liability and Ownership Risks Associated with Business Information Modeling

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CONSTRUCTING SOLUTIONS: ADDRESSING LIABILITY AND OWNERSHIP RISKS ASSOCIATED WITH BUSINESS INFORMATION MODELING

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I. INTRODUCTION

Business Information Modeling ("BIM") is defined by the National Institute of Building Sciences as the "computable representation of all the physical and functional characteristics of a facility and its related

* Note & Comment Editor (2023–24), *American University Business Law Review*; J.D. American University Washington College of Law, 2024; B.A. 2021, James Madison University. The author would like to express his gratitude for the support of the AUBLR staff and editorial board, as well as many faculty members, industry professionals, friends, and family members throughout this process.

project/life-cycle information."[1] Although BIM use brings a multitude of benefits to construction projects and the industry as a whole, the legal framework under which litigation occurs has lagged behind the technological development; as a result, parties to many projects must traverse legal uncertainty over implementing BIM into their work, despite the great deal of assistance that they could obtain by using it.[2]

Though traditional laws of construction and interdisciplinary fields may be underdeveloped for modern technology like BIM, courts can logically extend the applicability of existing precedent to BIM projects, which could largely resolve the uncertainty over legal risks associated with its use in a project.[3] Furthermore, in the absence of litigation, parties can utilize precise contract drafting and modern technologies to resolve disputes and manage risk that may arise during construction projects that utilize BIM.[4]

One leading concern of parties utilizing BIM that prevents its maximum utilization across the industry is the liability of each party within the project, especially where there are blurred allocations of responsibility or complex, collaborative interactions between the parties.[5] Often, disputes arise when parties communicate poorly while exchanging important technical information, especially when this transfer occurs at the border of the design phase and the construction coordination phase of the overall project (or even for a part of the project).[6]

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1. Howard W. Ashcraft, *Building Information Modeling: A Framework for Collaboration*, 28 CONSTR. LAW. 5, 5 (2008).

2. *See id.* (discussing how parties are forced to navigate legal uncertainty when using BIM technology and how several practitioners and their attorneys have decided to "contractually wall off the building information model—thus depriving the model of its greatest benefits").

3. *See* Kyle Smith, *Quarrelling Collaborators: The Flip Side of BIM's Interoperability*, ABA FORUM ON CONSTR. L. (Oct. 1, 2017), https://www.americanbar.org/groups/construction_industry/publications/under_construction/2017/fall/quarrelling-collaborators/ (finding that, "[a]s is often the case in the industry, the technology underlying BIM has raced far ahead of the legal framework necessary to facilitate the enhanced interoperability that BIM promises").

4. *See id.* (discussing that "the increasing use of BIM" brings "an increasing need for better documentation of the contributions and contractual relationships associated with BIM collaboration").

5. *See, e.g.*, Mitch Cohen, *BIM Use Increases Professional Liability Exposures*, CAVIGNAC & ASSOC. INS. BROKERS: CONSTR. INDUS. UPDATE 2–3 (Dec. 2011) (discussing how a general contractor can create potential liability for themself when they interact as a consultant or advisor during the design phase, particularly when their recommendations prove to be problematic elements in the construction phase of the project).

6. Constanța-Nicoleta Bodea & Augustin Purnuș, *Legal Implications of Adopting Building Information Modeling (BIM)*, 8 JURIDICAL TRIB. 63, 68 (2018) (finding that "[m]any disputes [in a BIM project] occur because of the poor communication and the

Ownership is another leading concern among parties of construction projects using BIM.[7] Although ownership of the model is typically solved through the basic provisions in a contract, ownership of the individual designs within a model by each design professional (e.g., architect, engineer) is often more blurred due to the collaborative nature of the model.[8] In some projects, these ambiguities can implicate serious intellectual property disputes, particularly as they affect the rights of the owner over the model, such as if the owner wishes to reuse the model or use the designs in derivative works.[9] Additional intellectual property concerns may arise in cases where the owner seeks to alter the original model against the design professional's wishes.[10]

Though current contractual guidelines and templates for construction projects using BIM are not perfect in addressing the legal concerns of parties to the project — and therefore not yet widely adopted across the industry — precise contract drafting is one method of effectively managing and controlling risk within the project.[11] Furthermore, some newer BIM projects and users have begun to utilize new technology, including blockchain and other distributed ledger technology, to better identify and track work within a project as a method of managing and controlling risk.[12]

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ineffective information exchanges between involved parties").

7. *See id.* at 64 (determining that "[s]ome of the main challenges when adopting BIM" can include "[d]ilution of design ownership" because "different design and construction parties develop and revise the BIM," making "the design responsibility become . . . vague").

8. *See* Ashcraft, *supra* note 1, at 10 (discussing that, while "[m]any of the intellectual property issues are similar to those that existed before BIM[,]" the issues "are amplified by the amount of information contained in the BIM and its ease of transfer").

9. *See* Bodea & Purnuş, *supra* note 6, at 69 (determining that one of the many "key issues affected by BIM" in construction projects includes "intellectual property rights").

10. *See* Javelin Invs., LLC v. McGinnis, No. H-05-3379, 2007 U.S. Dist. LEXIS 21472, at *19–21 (S.D. Tex. Jan. 23, 2007) (discussing the more limited scope of protection given to copyright owners of architectural designs, which typically does not exceed the right of the owner to alter or destroy a work after its completion in the United States).

11. *See* Muhammad Farhan Arshad et al., *Contractual Risks of Building Information Modeling: Toward a Standardized Legal Framework for Design-Bid-Build Projects*, 145 J. CONSTR. ENG'G & MGMT. 1, 4–5 (2019) (finding that there are several contract documents that "incorporate some of the legal risks of BIM" but that many of them, like the "AIA E203 BIM addendum[,]" cover only a few risks, "overlooking major issues like professional liability" that are sometimes present in other BIM contracts used in projects).

12. *See* Michael Kuperberg & Matthias Geipel, *Blockchain and BIM (Business Information Modeling): Progress in Academia and Industry*, RESEARCHGATE (Mar. 7,

This Comment will first discuss the background of BIM, including its technological characteristics and implementation into a complex construction project, as well as the potential benefits that incentivize parties to utilize BIM in a project. Next, this Comment will discuss the legal risks and uncertainty associated with BIM, particularly regarding ownership and liability. Specifically, this Comment will focus on ownership of the intellectual property and designs within an overall model and will contrast liability in traditional construction projects with liability in a construction project utilizing BIM. Lastly, this Comment will discuss potential solutions to these risks and uncertainties. The analysis of potential solutions will include a discussion of the legal and policy considerations that courts should undergo when handling BIM litigation. Additionally, recognizing that courts have lagged behind rapid technological advancements like BIM in creating modern precedent, this analysis will include a discussion of methods that parties can take outside of litigation to manage and control legal risk, particularly through precise contract drafting and use of modern technologies like blockchain and other digital ledger technologies.

By providing the necessary background, analyzing primary legal issues with the implementation of BIM technology, and making recommendations for both courts and parties to solve these issues, this Comment seeks to provide a path for ameliorating the legal uncertainty surrounding BIM so that it can be more effectively adopted in the construction industry.

II. BACKGROUND: THE APPLICATION OF BIM IN COMPLEX CONSTRUCTION PROJECTS

A. BIM Technology Generally

While BIM models are typically defined as computable representations of both the physical and functional characteristics of a facility across its entire life cycle (starting pre-construction), this definition understandably fails to encompass the far more complex nature and depth of a BIM model's capabilities.[13] BIM largely reshapes the construction process by simulating construction in a three-dimensional space (compared to

2021) (discussing that "[t]raditionally, ledgers are append-only data structures which, by design, keep a full history of changes[,]" which can be used in BIM technology to track alterations or additions to the BIM model).

13. *See* Ashcraft, *supra* note 1, at 5–6 (asserting that the general definitions of BIM disserve understanding the full scope of BIM, which is far beyond the technology of "traditional design tools" in data representation, extraction, efficiency, and storage, as well as expand the collaborative nature of a project more effectively than other preceding software).

traditional, two-dimensional design schematics) across several design professionals in a fashion that extends beyond traditional Computer-Aided Design ("CAD") technology.[14]

For example, BIM technology allows design professionals to synthesize their separate design works into a single, cohesive model, permitting these professionals to refer to other specifications in making their designs; this collaboration naturally increases accuracy and efficiency in the coordination process.[15]

Additionally, because BIM is a computational technology, the model does more than simply represent a structure in a three-dimensional space; rather, it is closer to a *simulation* of a facility, allowing parties in a project to engage in interactive analysis of a purported design and understand how it will function in the real world after construction.[16] Furthermore, the model allows this computational data to be manipulated, extracted, and independently analyzed, and this data enables the model to reflect cost estimates, schedules, inventories for project materials, and other additional project characteristics.[17]

Essentially, BIM models serve as the "central point[s] of reference" for a massive amount of data and specifications, both mechanical and managerial, which would otherwise lead to far more time-intensive and efficiency-hindering efforts to organize.[18] Additionally, in a more practical

14. *See* Salman Azhar, *Building Information Modeling (BIM): Trends, Benefits, Risks, and Challenges for the AEC Industry*, 11 LEADERSHIP & MGMT. IN ENG'G 241, 241–42 (2011) (discussing how BIM is a "virtual process that encompasses all aspects, disciplines, and systems of a facility" and allows "all design team members (owners, architects, engineers, contractors, subcontractors, and suppliers) to collaborate more accurately and efficiently than using traditional processes" through constant revision and adjustment of specifications on a collaborative model).

15. *Id.* at 243 (determining that, "[b]ecause building information models are created to scale in 3D space, all major systems can be instantly and automatically checked for interferences").

16. *See* Ashcraft, *supra* note 1, at 5–6 (discussing how BIM creates a "digital simulation of a facility that can be viewed, tested, designed, constructed, and deconstructed digitally" rather than simply a "three-dimensional picture").

17. *See id.*, at 6–8 (finding that some of the main ways in which BIM is being utilized includes enhancing data entry, promoting design and cost efficiency, promoting early conflict identification and resolution, estimating costs and scheduling, optimizing energy costs and output, streamlining construction and facilities management, and creating more accurate and detailed conceptual designs prior to construction); *see also* Azhar, *supra* note 14, at 241–42 (discussing how BIM can support "design, procurement, fabrication," and other processes in the aim of "realiz[ing] the building[,]" but can also be used "after completion" for "operation and maintenance purposes[,]" serving as an integration of "people, systems, and businesses structures and practices" at "all phases of the project life cycle.").

18. *See* TORSTEN PRIEBE & STEFAN MARKUS, BUSINESS INFORMATION MODELING:

light, using BIM as a central point of reference allows parties to decrease unforeseen costs and errors by typically identifying them *before* irreversible construction begins.[19]

A non-exhaustive list of the most valued uses for BIM include: obtaining accurate three-dimensional visualization; representing future functionality in real space; identifying early clashes between multiple design specifications; achieving advance-planning of a project's entire life cycle; and obtaining data to estimate cost, time, and other specifications (either from the project owner or, sometimes, within other guidelines like municipal codes).[20] Typically, all of these uses can be achieved to some degree before construction begins, but they can also be used throughout the project.[21] In many cases, BIM models are considered to be four-dimensional or five-dimensional in their entirety because they include elements like cost estimation and scheduling abilities; these dimensions go beyond the three-dimensional geometrical and spatial elements that a typical digital model provides.[22]

BIM's usefulness also spans across each phase of a project, providing benefits throughout its life cycle.[23] In the planning phase of a project, BIM can provide basic context to construction projects and how they fit into the natural environment they will be built in.[24] In the design phase of the

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A METHODOLOGY FOR DATA-INTENSIVE PROJECTS, DATA SCIENCE, AND BIG DATA GOVERNANCE, 1966 (2015 IEEE INT'L CONF. ON BIG DATA 2015) (finding that one potential and positive use of BIM in data-intensive projects is the ability to use a model as a "central point of reference" for data governance and integration throughout a project).

19. *Id.*

20. *See* Azhar, *supra* note 14, at 242–43 (finding these uses to be some of the most common ways BIM technology is utilized).

21. *See id.* (asserting that BIM supports "the concept of integrated project delivery," creating a "collaborative process to reduce waste and optimize efficiency through all phases of the project life cycle").

22. David Bryde et al., *The Project Benefits of Building Information Modeling (BIM)*, 31 INT'L J. PROJECT MGMT. 971, 972–73 (2013) (discussing, for example, that five-dimensional BIM models can offer the project manager "more tools at his disposal to keep tight reigns [on costs], and more reports to monitor progress" through budget control elements of the software, which exceeds the ability of preceding digital construction technology).

23. *See* Azhar, *supra* note 14, at 242–43 (discussing how the usefulness of BIM technology can bring a variety of benefits in multiple phases of a project, often prior to when any construction begins).

24. *See* AUTODESK, *What Are the Benefits of BIM?*, https://www.autodesk.com/industry/aec/bim/benefits-of-bim (discussing how BIM can "inform project planning" in the planning phase of a project by "generat[ing] context models of the existing built and natural environment").

project, BIM can provide advanced conceptual design allowing parties to create an immensely detailed project plan before the construction process even begins.[25] During the building process, BIM can serve as an extraordinarily detailed guide for specification guardrails that each party must abide by, as well as serve as a point of reference for the work other parties are doing, preventing conflicts that would otherwise arise much later in the construction process.[26] Lastly, even after construction finishes and the project is in operation, BIM can continually provide benefits as the building is maintained and updated.[27]

In these respects, understanding BIM requires legal scholars to view it not just in light of its software but also as a process of the construction project itself; that is, BIM helps parties formulate and adjust the workflow, responsibilities, and delivery process within a project as well.[28] Because the use of BIM is collaborative, it can positively alter relationships in the industry.[29] Such a change in the relationships between parties can drastically alter traditional industry practices in a way that can benefit both the owner and the parties to the construction process.[30]

Accordingly, the process of using BIM has been increasingly referred to as "Virtual Design and Construction" to accurately represent its importance beyond simply creating geometrical models.[31] For these reasons, while

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25. *See id.* (discussing how, in the preconstruction phase, BIM can "inform scheduling and logistics[,]" as well as aid "conceptual design, analysis, detailing, and documentation").

26. *See id.* (discussing how BIM, in addition to guiding fabrication with specifications included in the model, can provide logistical support between design professionals, general contractors, and subcontractors "to ensure optimum timing and efficiency" in the project and reduce errors that could substantially affect timing and efficiency).

27. *See id.* (discussing how "BIM data carries over to operations and maintenance of finished assets[,]" including for "cost-effective renovation or efficient deconstruction" among other uses).

28. *See* Azhar, *supra* note 14, at 242 (asserting that the use of "BIM means not only using three-dimensional intelligent models but also making significant changes in the workflow and project delivery process").

29. *See id.* (discussing how BIM can "promote greater efficiency and harmony among players" who were characteristically adversaries in many projects because BIM "encourages integration of the roles of all stakeholders on a project" rather than for each party to serve themselves).

30. *See id.* at 251 (finding that "BIM represents a new paradigm within AEC" by promoting the integration of relationships and roles which were previously characterized by individual, critical review by each party as a "mutual guarding of each [of their] own interests" though such a change naturally comes with legal risks that parties must address to take full advantage of it).

31. Bodea & Purnuş, *supra* note 6, at 65 (asserting that "[t]he process of using BIM models to improve the planning, design and construction process is increasingly being

BIM technology is helpful in managing certain elements of construction projects in isolation, the easiest way to view the impact of BIM on a project overall (especially for those without technical knowledge) is as an information management tool that parties can use throughout the construction process.[32]

However, easier or earlier access to information, while an extraordinary aid in a construction project, is not the only benefit that arises from using a BIM model. Several real-world BIM projects have demonstrated the feasibility of reaping these additional, practical benefits.[33]

B. Benefits Associated with Using BIM

By utilizing BIM technology, parties to a complex construction project can obtain a variety of benefits including, but not limited to, cost estimation, scheduling, more accurate geometrical representation, and increased collaboration.[34] Problems often arise in the construction process with transfers of information, such as between design professionals during the design development process or during handoff to the general contractor at the start of the construction phase, and when synthesizing data across different software (which are not always standardized across a project).[35]

BIM software is capable of acting as a single-source data entry system, which prevents the duplicative and excessive data transfers between parties that often lead to errors.[36] Furthermore, BIM software is capable of automatically updating the model to reflect not only changes made but effects those changes have on other parts of the model, reducing the likelihood that implementations fail to reflect the full scope of changes on

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referred [to] as Virtual Design and Construction").

32. PRIEBE & MARKUS, *supra* note 18, at 1967 (noting that the authors focused on BIM as a data management tool rather than only as a guideline for the actual construction process to properly characterize its construction role).

33. *See generally* Bryde et al., *supra* note 22, at 972–73 (asserting that, in many cases, the quality of the project process and project result improved due to BIM's design and efficiency benefits, which will likely become a key driver of demand for owners to prefer and request BIM in their projects).

34. *See generally* Ashcraft, *supra* note 1, at 6–8 (listing various ways in which BIM is being used in construction projects and the various benefits associated with its use, including for efficiency, quality, scheduling, cost-estimation, conceptualization, and dispute or cost-avoidance).

35. *See id.* at 7–9 (finding that "[i]n current practice, there are differences in capability between BIM software[,]" and the software will naturally come with "residual flaws" in addition to human error during the handoff process).

36. *Id.* at 7 (determining that, "[b]y consolidating information into a unified data source, the likelihood of data entry, translation, or versioning errors is greatly decreased").

the overall model.[37] Several companies in the business of developing BIM software, particularly Autodesk, have also been moving their technology toward increased interoperability and cloud capacity, which reduces the chance that changes in software type during a project will cause errors, especially when parties stay within the same family of software products.[38]

Additionally, the benefits of using BIM are inherent to the model's function. Most importantly, these include estimation of costs, both for the project and for the finished facility (such as energy costs), and reduction of costs through early clash detection and fabrication planning, as well as by allowing parties to visualize alternative, potentially cheaper solutions and designs more easily than the traditional design process.[39]

A strong example of the cost benefit of using BIM in a complex construction project can be seen in the Aquarium Hilton Garden Inn in Atlanta, Georgia.[40] The BIM in this project, which cost under $100,000, detected dozens of clashes in the design phase alone and easily offset its own cost through these discoveries.[41] Even adopting an extremely conservative approach, that 75% of the errors across the project were (or would have been) resolved through traditional means, the BIM still saved over $200,000 in avoiding the cost of errors that arose as well as almost 1,200 schedule hours.[42]

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37. *Id.*

38. *See* Jeff Yoders, *Autodesk to Launch Construction-Specific Cloud Collaboration Platform*, ENG'G NEWS–RECORD (Oct. 2, 2022), https://www.enr.com/articles/54930-autodesk-to-launch-construction-specific-cloud-collaboration-platform (discussing how, although Autodesk is "separating its cloud offerings into three separate platforms[,]" divided by each major industry it caters to, it primarily focuses on guaranteeing "data interoperability among all of its design and content creation tools").

39. *See generally* Ashcraft, *supra* note 1, at 7–8 (discussing how, in addition to literal cost and time benefits on a project site, BIM can offer enhanced "visualization of alternative solutions and options[,]" "functional simulations" of facilities, and multidimensional, digital constructions that have additional elements beyond the facility, such as scheduling or clash detection).

40. *See* Azhar, *supra* note 14, at 244–46 (asserting that, "[i]n a nutshell, the Aquarium Hilton Garden Inn project realized some excellent benefits through the use of BIM technology and certainly exceeded the expectations of the owner and other project team members").

41. *Id.* at 244–45 (discussing that almost 600 clashes were detected in the Aquarium Hilton Garden Inn project through BIM usage prior to the start of the construction phase, which were shared with the design team so that the clash could be resolved before beginning construction).

42. *See id.* at 245 (discussing how the sequential composite overlay process, a conventional practice for detecting errors before construction begins, would likely not, even in a conservative estimate, have caught at least 25 percent of the errors detected by the BIM).

Another strong example, perhaps an outlier but demonstrative of the cost savings a BIM can achieve when successfully implemented, can be seen in the construction of Savannah State University in Savannah, Georgia.[43] In this case study, contractors implemented a BIM for approximately $5,000 on a $12 million project.[44] By facilitating rapid decision-making, as well as revealing the most financially optimized decisions in design plans, the BIM delivered cost savings of nearly $2 million (depending partially on what decisions the owner would have chosen without the BIM cost estimates).[45] Examples like these indicate that the return on investment ("ROI") of a BIM model can sometimes be over 1000%.[46]

Theory aside, BIM has clear practical benefits, as shown by the Aquarium Hilton Garden Inn and Savannah State University projects.[47] BIM has the potential to save money, expedite the project timeline, prevent or resolve potential clashes and errors early, and centralize information storage and access, among a vast number of other benefits. However, with rapidly developing technology, precedent naturally struggles to keep pace, which leads to a number of legal issues and uncertainties surrounding BIM and, accordingly, hinders its use on a wider scale.[48]

C. Legal Implications of Using BIM

While BIM technology can be enormously beneficial in a complex construction project, there is a vast amount of legal uncertainty that leaves some professionals hesitant to adopt its use.[49] The nature of construction disputes exacerbates this situation because they rarely go to litigation. One such reason is that most construction contracts include default arbitration clauses.[50] It is therefore no surprise that some professionals are wary,

43. *See id.* at 246–47.

44. *Id.* at 246.

45. *See id.* at 246–47 (discussing that, although "it could be argued that the owner may have reached the same conclusion using traditional drawings, the use of BIM technology helped him make a quick, definitive, and well-informed decision").

46. *See id.* at 249 (noting that "the BIM ROI for different projects varied from 140% to 39,900%[,]" but "[o]n average, it was 1,633% for all projects" that included some level of a planning or value-analysis phase).

47. *See id.* (highlighting massive returns on BIM investment by the end of these projects).

48. *See, e.g.*, *id*. (crediting the return on investment in many projects to these benefits, achieved through the use of BIM).

49. Ashcraft, *supra* note 1, at 5 (discussing how, because legal structures trail behind the advancing BIM technology, practitioners and attorneys have often chosen to "wall off the building information model" out of liability concerns, "depriving the model of its greatest benefits").

50. *ConsensusDocs and AIA Dispute Provisions*, SMITH CURRIE (Mar. 20, 2018),

especially with minimal binding precedent existing to guide their BIM implementations.

One primary concern when implementing BIM is the liability issue, which becomes vague in construction projects using BIM if not allocated by contract.[51] Often, liability and legal risk are enhanced in BIM projects by virtue of BIM's inherently collaborative nature, where parties work together in sharing information and implementing designs such that there is often shared responsibility to address (or at least identify) clashes and errors during the process.[52]

For example, one traditional precedent that some legal scholars are reviewing in light of BIM projects is the *Spearin* doctrine. This century-old Supreme Court doctrine prohibits liability for contractors who fail to identify defects in plans and specifications given to them in projects where they are bound by their contract to closely follow narrow specifications and are not otherwise deeply involved in the design stage.[53] Some legal scholars predict that the *Spearin* doctrine may be eroded if BIM is heavily litigated, especially because in most BIM cases the contractor would have inherently assumed more responsibility for evaluating interoperability of the various designs under the collaborative framework of project delivery that BIM embodies.[54]

Liability issues are usually resolved at the contractual level, but disputes continually arise on a regular basis; "poor contract administration" in the early stages of a project is one of the primary avenues through which these

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https://www.smithcurrie.com/publications/common-sense-contract-law/consensusdocs-aia-dispute-provisions/ (explaining that both "ConsensusDocs and AIA contracts require that the parties engage in a multi-step ADR [alternative dispute resolution] process to resolve their disputes" before resorting to litigation).

51. *See* Azhar, *supra* note 14, at 250 (asserting that many of the risks that come with BIM concern how it will be used and how such responsibility is allocated, which can carry liability when responsibility is not clearly defined in contract or otherwise made unambiguous).

52. *Id.* (determining that "[t]he integrated concept of BIM blurs the level of responsibility so much that risk and liability are likely to be enhanced").

53. *See* United States v. Spearin, 248 U.S. 132, 136–39 (1918) (holding that "one who undertakes" a duty or "agrees to do . . . a thing possible to be performed" ordinarily "assumes" the risk with these endeavors by agreement, but contractors are not "responsible for the consequences of defects in the plans and specifications" when they are "bound to build according to plans and specifications prepared by the owner").

54. *See* Yuxing Jiang et al., *Contractual Governance of BIM-Enabled Projects: Where Are We?,* 7 INT'L J. ARCHITECTURE, ENG'G & CONSTR. 1, 5 (2018) (discussing precedent that indicates contractors may lose *Spearin* protection, at least in part, when they contribute information toward the project during the design phase characteristic of consulting).

disputes arise.[55] Some companies are now experimenting with modern technology in conjunction with BIM to address or ameliorate liability concerns.[56] For example, one leading effort is to use blockchain and other digital ledger technology to create a record of all the changes made in a model, including who made the changes and when they were made.[57]

BIM usage tends to implicate many areas of risk and responsibility because of its collaborative nature, and therefore may carry more types of liability or opportunities for liability to arise than traditional construction projects.[58] For example, the interoperability of data between models, each of which will be synthesized in the BIM, is an area for concern because the translation of data from one software to another is not seamless with current technology — though this is one area of improvement that companies developing BIM software are currently focusing on for the near future.[59]

One of the other principal legal concerns of parties over projects using BIM is ownership. The issue of ownership tends to be fact-intensive, and it often implicates both ownership of the overall model by the project owner and concerns by designers over the ownership or rights associated with their proprietary information and intellectual property, especially when an owner desires to alter, reuse, or produce subsequent models using these existing designs.[60]

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55. Grace Ellis, *Construction Risk Management: How to Reduce Top Construction Risks*, AUTODESK CONSTR. (Aug. 17, 2023), https://constructionblog.autodesk.com/top-construction-risks/ (finding that disputes often can be proactively solved, or litigation can be expedited, through diligent and careful documentation, but that a failure to do so is often a primary reason that the dispute arises in the first place).

56. *See* Nancy Greenwald, *BIM, Blockchain, & Smart Contracts*, CONSTR. INST. 1, 5 (Jan 13. 2021), https://www.construction.org/blog--articles/bim-blockchain-smart-contracts (discussing BIM Chain, a European start-up, and DigiBuild, a U.S. software company, as two of several companies that are currently working on integrating BIM technology and blockchain capabilities).

57. *See* Paras Taneja, *Scope of Blockchain in BIM*, AUTODESK (last visited June 11, 2024), https://www.autodesk.com/autodesk-university/article/Scope-Blockchain-BIM-2020 (asserting that "[b]lockchain can address issues surrounding [sic] access to a BIM model and allow for a reliable audit of who made the changes, when they were made, and what those changes were").

58. *See generally* Azhar, *supra* note 14 (discussing generally a variety of areas where legal risks may exist in BIM projects to a greater extent than traditional projects, most of which would create liability for at least one party to a project).

59. *See id.* at 250 (finding that models "communicating seamlessly" during integration "is an aspiration," but not currently a reality, and that "deficiencies in plans or other deliverables" created from errored integration or synthesis may create liability for the party responsible for the integration (which is not always clearly set out in contract)).

60. *See id.* (asserting that the "first risk [of BIM] is the lack of determination of

Congress extended copyright protections to architectural works in the Architectural Works Copyright Protection Act ("AWCPA"), including to designs of the building embodied in plans and drawings, though the copyright protection is thinner than most copyright protections; standard architectural features not exhibiting creativity are not typically copyrightable, nor are features that are implemented for functional and non-creative purposes.[61] The Copyright Act now reflects that architectural works are presumptively copyrightable so long as they meet the originality requirements and are not otherwise deemed outside the scope of copyright protection.[62] In many cases, a project owner could include provisions in a contract that transfer or assign the copyright of the designs from the start, but such an action is not necessarily automatic absent express contract provisions directing it.[63]

Additional issues on ownership of designs arise, even if the designer retains his copyright, when there is an argument that the conduct of the parties constituted an implied license, which could then raise questions about the scope of the license, such as whether the license includes the rights of reuse or to create derivative works and to what extent design professionals retain control, liability, etc. in these endeavors.[64] Questions also arise as to whether design synthesis between design professionals could constitute a joint work, which merely requires two or more parties to contribute copyrighted material and to intend at the time of contract formation for these materials to inseparably and interdependently form a unified whole.[65] It should be cautioned, however, that the copyright in this

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ownership of the BIM data and the need to process it through copyright laws and other legal channels").

61. David H. Bowser, *Understanding the Scope of Architectural Copyright Protection*, AM. INST. OF ARCHITECTS, https://www.aia.org/articles/26591-understanding-the-scope-of-architectural-cop (Feb. 17, 2017) (highlighting that "ideas," or expressions indistinguishable from them, as well as "standard or stock elements" of construction or "facts and other public information[,]" are not copyrightable).

62. *See* 17 U.S.C. § 102 (providing that architectural works are included in the non-exhaustive list of works that the act presumptively considers to be "works of authorship" so long as they meet the general requirements of originality and do not fall into any categorical or judicially created exceptions to copyright protection).

63. *See* McCormick v. Amir Constr., Inc., 279 F. App'x 470, 471–72 (9th Cir. 2008) (discussing that copyrights are transferred when the unambiguous terms of a contract show intent that the copyrights be transferred, in contrast to terms that would indicate a non-exclusive or exclusive license in place of an actual transfer).

64. *See* Azhar, *supra* note 14, at 250 (determining "[w]hen project team members other than the owner and architect/engineer contribute data that are integrated into the building information model, licensing issues can arise").

65. *See* Childress v. Taylor, 945 F.2d 500, 507–08 (2d Cir. 1991) (finding that all

joint work would be thin (if existent at all) because most of the elements that go into the BIM are inherently functional (which do not qualify for protection).[66]

Lastly, the BIM development process could also implicate "works made for hire," which would automatically vest the copyright in the owner of the model or project (who is considered the "author" of the work made for hire).[67] This characterization is met when either the design professional is an employee acting within the scope of employment or is an independent contractor contributing to a collective work of a specific type (of which architectural works are not included).[68] As such, the preexisting relationships between contractual parties in a BIM project are critical for determining intellectual property ownership when a dispute arises.

While disputes over the ownership of BIMs, particularly over the original works of design professionals within the BIM, are typically avoided through careful contract drafting, potential litigation over BIM ownership requires lawyers to carefully navigate copyright law to dispel legal uncertainty within a project when careful contract drafting is insufficient.

III. ANALYSIS: SOLUTIONS TO THE LEGAL RISKS OF BIM AND POLICY CONSIDERATIONS FOR COURTS IN BIM LITIGATION

A. Ownership Concerns: Intellectual Property and Industry Policy Considerations

A primary issue of ownership regarding BIM development, which is a focal point in this Comment, is the existence and character of intellectual property within the models, primarily from design professionals.[69] This

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joint owners must have intended to create a joint work and contributed some level of copyrighted material, but could otherwise obtain ownership rights through contract if either of these requirements were not met).

66. Bowser, *supra* note 61, at 3 (discussing that "[f]eatures that are as a practical matter indispensable, or at least standard, in the treatment of a given idea are not protected by copyright").

67. *See* 17 U.S.C. § 201 (providing that copyright "vests initially in the author of the contribution" but that "in the case of a work made for hire, the employer or other person for whom the work was prepared is considered the author for purposes of this title" and "owns all of the rights comprised in the copyright" unless "the parties have expressly agreed to otherwise in a written instrument signed by them").

68. *See* 17 U.S.C. § 101 (providing that works made for hire are (1) works made by an employee within the scope of his employment; or (2) works "specially ordered or commissioned for use as a contribution to a collective work" within a list of particular types of works (not including architectural works)).

69. *See, e.g.*, Katie Liszka, *BIM Raises Liability and Copyright Issues*, CONSTR.

requires courts, as an initial matter, to determine the type and nature of any existing copyrights.

As a starting point, the Copyright Act requires that all copyrights be original works of authorship and fixed in a tangible medium of expression.[70] The Supreme Court has added a judicial gloss that "original works of authorship" must also contain a "modicum of creativity."[71] While the Copyright Act did not originally specify architectural works as entitled to protection, Congress made this extension in recent years.[72] Design plans for an architectural work, to the extent they contain non-functional elements that include creative expression and original choices, presumptively qualify for copyright protection.[73] Once the copyright is established, there are three primary legal areas that courts must look to in order to navigate intellectual property litigation over ownership within a BIM project: works made for hire, joint works, and transfer and assignment of copyrights.[74]

First, with works made for hire, courts should determine whether designs constituting a part of a BIM model fall under the scope of employment. Works made for hire automatically vest copyright in the owner of the project (the "author") when they meet one of two situations listed in the Copyright Act.[75] First, when an employee acts within the scope of employment, as determined by the totality of the circumstances

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MGMT. GUIDE (Nov. 14, 2011), http://www.cmguide.org/archives/2648 (asserting "[i]n a BIM-generated 3D model, the mechanical design . . . is distinct from the architectural design, even if they are ultimately shown in a composite image").

70. *See* 17 U.S.C. § 102 (providing that "copyright protection subsists . . . in original works of authorship fixed in any tangible medium of expression" and includes "architectural works" in the categorical list of presumed works of authorship when they meet these general copyright requirements).

71. Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 362 (1991) (providing that mere selection of choices only constitutes and becomes a type of creative expression, which is necessary to make the choices copyrightable, when the choices express a "modicum of creativity").

72. Bowser, *supra* note 61, at 1 (discussing that, "[i]n 1990, Congress passed the Architectural Works Copyright Protection Act (AWCPA) to protect the intellectual property of architects").

73. *See id.* at 2 (discussing that, "per the definition [in the AWCPA]," the "original combination or arrangement" of elements may be copyrightable, but the "individual standard features and architectural elements classifiable as ideas or concepts" are not because they fail to meet the originality requirements that all works are subject to in the Copyright Act).

74. *See* 17 U.S.C. § 201 (discussing joint works, works made for hire, and transfer and assignment of copyright).

75. *See id.* § 201(b) (providing that, for works made for hire, the author of the work is the hired party's employer).

surrounding the creation of a work, the copyright automatically vests in the author.[76]

Factors courts have developed to determine automatic vesting through an actual employment relationship include: (1) who provides the instrumentalities and tools; (2) the location the work takes place; (3) the level of discretion a hired party has in their job; (4) the method of payment and tax treatment of the hired party; (5) whether the hiring party is in the industry of the work or has regularly hired the party they have doing the work; and (6) the presence and provisions of employee benefits.[77] These factors are non-exhaustive, but courts often give special weight to tax treatment because it serves as evidence of what relationship the parties intended to create.[78]

BIM projects are largely collaborative, but they involve distinct parties contributing independent (even if related) efforts, each working on their subject of expertise and hired for a specific task rather than for general business; therefore, courts should treat typical design professionals in BIM projects as outside the scope of employment, in consideration of some of the above factors.[79] While cases may certainly arise where parties fall within the scope of employment, the independence that design professionals have in their "sphere" of the project before integration should lead courts to treat these professionals as independent contractors.[80]

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76. *See id.* § 101 (lacking a definition for either "employee" or "scope of employment," which has left courts to judicially define these terms in the decades following the current Copyright Act going into effect).

77. *See* Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 751 (1989) (listing the aforementioned factors as a non-exhaustive list to consider, without any factor being individually determinative, when courts are considering whether an individual was in an employment relationship or acting as an independent contractor).

78. *See* Eisenberg v. Advance Relocation & Storage, Inc., 237 F.3d 111, 114 (2d Cir. 2000) (finding that the *Reid* factors are non-exhaustive and additional factors may be taken into account as long as they are within the scope of the common law of agency, which the *Reid* factors were seeking to synthesize); *see also* RESTATEMENT (SECOND) OF AGENCY, § 220 cmt. h (expanding and adding to the *Reid* factors, including the level of skill required for the work, the time period of employment and regularity of hours (or lack thereof), the presence of a relationship characteristic of a master and servant, and the ability of the hired party to delegate tasks to another individual); Horror Inc. v. Miller, 15 F.4th 232, 253 (2nd Cir. 2021) (finding that the 2nd Circuit has consistently held that "the parties' tax treatment of their relationship is, along with employee benefits, 'highly indicative of whether a worker should be treated as a conventional employee for copyright purposes'" and that other circuits are in accord with that view).

79. *Eisenberg*, 237 F.3d at 116 (finding these characteristics of a BIM project to generally weigh in favor of finding the individual as an independent contractor rather than as within the scope of employment from the owner of the project).

80. Thomas Hayton, *Copyright for Architectural Works*, CUTLER NYLANDER &

To that effect, courts should consider design professionals in most BIM projects to be under the second work made for hire "type" dealing with independent contractors.[81] This second type requires that a "specially ordered or commissioned contribution to a collective work" be within one of several categorical types, such as "a motion picture or other audiovisual work, as a translation, as a supplementary work," or "as an instructional text," but architectural works are not one of these categorical types. Because architectural works are not in this list, they fail to act as a "work made for hire" under this independent contractor type.[82] Therefore, absent outlier cases when design professionals form an employment relationship, courts should not construe contributions to a BIM model to constitute a work made for hire and, therefore, should not deem copyrights to be automatically vested in owners on these grounds.[83]

Typically, parties include provisions in their contract about any assignment or transfer of rights.[84] Still, these contracts are not always sufficient to preclude the need for a court to analyze the copyright.[85] As a

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HAYTON LAW (Aug. 16, 2011), https://cnhlaw.com/copyright-for-architectural-works/ (the "norm for owner/architect contracts" is that architects function as independent contractors because they "have independent discretion over product and procedures" even if they are working within guidelines set by the owner).

81. *See id.*

82. *See* 17 U.S.C. § 101 (showing that architectural works do not appear in section (2) of "works made for hire" and are therefore precluded from being one under the independent contractor test; section (2) includes works "as a part of a motion picture or other audiovisual work, as a translation, as a supplementary work, as a compilation, as an instructional text, as a test, as answer material for a test, or as an atlas, if the parties expressly agree in a written instrument signed by them that the work shall be considered a work made for hire. For the purpose of the foregoing sentence, a 'supplementary work' is a work prepared for publication as a secondary adjunct to a work by another author for the purpose of introducing, concluding, illustrating, explaining, revising, commenting upon, or assisting in the use of the other work, such as forewords, afterwords, pictorial illustrations, maps, charts, tables, editorial notes, musical arrangements, answer material for tests, bibliographies, appendixes, and indexes, and an 'instructional text' is a literary, pictorial, or graphic work prepared for publication and with the purpose of use in systematic instructional activities").

83. *See* Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 751 (1989) (finding that an employment relationship should not be created when the independence of the design professional and the discretion they have in their work product or process is great, among other factors).

84. Sarah Wales-Canning & Danny Rand, *Why Assignment Provisions in Construction Contracts Make All the Difference to Lenders*, WOMBLE BOND DICKINSON (June 9, 2023), https://www.womblebonddickinson.com/uk/insights/articles-and-briefings/why-assignment-provisions-construction-contracts-can-make-all.

85. *See* Jeri Adin Ardani et al., *Model Ownership and Intellectual Property Rights for Collaborative Sustainability on Business Information Modeling*, 11 BLDGS. 346,

starting matter, the conveyance of a copyright needs to be in writing and signed by the owner of the copyrighted design (as distinct from the model) or his agent.[86] Interestingly, courts are split on several issues regarding the specificity and structure of these transfers.[87]

For example, some courts allow ambiguity in the transfer of copyrights (with parol evidence supporting arguments in litigation), whereas others deem that any ambiguity in a transfer must be interpreted in favor of the original copyright holder to ensure the result of the transfer is intentional.[88] Additionally, circuits are split on whether a contract can merely confirm an earlier oral agreement or whether it must be the result of additional discussion, negotiation, or drafting.[89]

Courts in BIM litigation will be required to balance the copyright interests of parties with the practical realities of a construction project.[90] As such, courts should extend earlier precedent that presumptively requires express transfer or assignment of copyright (in writing and unambiguous), but as a balance, take a less rigid approach to finding non-exclusive implied licenses.[91] This approach is not only strongly rooted in precedent but also allows parties in a BIM project to come to a logical and practically sound compromise: copyright owners will retain the rights in their designs absent express transfer or assignment, but project owners will have the leeway to

348 (2021) (finding that the financial risks and delays that may be imposed on a project by intellectual property concerns can lead to litigation when a clear understanding of ownership and responsibility is not agreed upon before the project).

86. 17 U.S.C. § 204(a) (providing that "a transfer of copyright ownership, other than by operation of law, is not valid unless an instrument of conveyance . . . is in writing and signed by the owner of the rights conveyed or such owner's duly authorized agent").

87. *See generally* SCO Grp. v. Novell, Inc., 578 F.3d 1201 (10th Cir. 2009); Bieg v. Hovnanian Enter., Inc., 157 F. Supp. 2d 475, 483–84 (E.D. Pa. 2001).

88. *See SCO Grp.*, 578 F.3d at 1212 (refusing to read Section 204 with "such an onerous restraint on the alienability of copyrights" absent evidence in legislative history that the provision was intended to be interpreted in such a strict manner). *But see Bieg*, 157 F. Supp. 2d at 483 (finding that a valid transfer of copyright must include a transfer document that is in writing, signed, and clear as to the transfer, refusing to enforce a transfer that is ambiguous).

89. *See* Billy-Bob Teeth v. Novelty, Inc., 329 F.3d 586, 591 (7th Cir. 2003) (citing precedent from the 11th Circuit that interpreted Section 204(a) as allowing a writing that merely confirms and executes an earlier oral agreement). *But see* Konigsberg Int'l, Inc. v. Rice, 16 F.3d 355, 356–57 (9th Cir. 1994) (finding that the detail in a written conveyance of copyright must be more specific regarding the transfer than ambiguously confirming an earlier oral agreement).

90. See *generally SCO Grp.,* 578 F.3d at 1212; *Bieg, Inc*., 157 F. Supp. 2d at 483.

91. *See* Effects Associates, Inc. v. Cohen, 908 F.2d 555, 558–59 (9th Cir. 1990) (favoring the finding of implied nonexclusive licenses when the contributions are only logically valuable with the presence of a license to use it in a particular way).

establish a non-exclusive license so that they can use the designs within the practical realities of construction work.[92]

Lastly, courts must determine if a joint work exists when analyzing BIM projects, especially when considering the model as a whole. The Copyright Act requires that for two works to constitute a joint work (in which the Act treats owners like tenants-in-common), the parties must intend at the time of the contract or contribution that their works be "merged into inseparable or interdependent parts of a unitary whole[,]" and that the contributions be copyrightable works on their own.[93]

As a practical matter, designs are merged into an interdependent model, and § 101 uses the term "or" (so the model would not have to be interdependent *and* inseparable). However, § 101 also specifically highlights that the parties' *intent* at the time of contract formation or contribution must have been to merge the works.[94] Presumptively, design professionals are better suited when *not* intending this merge to occur, because doing so would dilute their copyrights — as a joint author, each party would have rights to all of the elements of the model, including each architect's individual design, because the Copyright Act treats them as tenants-in-common.[95] As such, it would often not be logical to assume a reasonably knowledgeable design professional would intend his work to become inseparable from the model.[96] Therefore, courts should continue to require the claiming parties to substantiate joint authorship claims with

92. *See generally Billy-Bob Teeth, Inc.*, 329 F.3d at 591; *Konigsberg Int'l, Inc.*, 16 F.3d at 356–57; *Effects Associates, Inc.*, 908 F.2d at 558–59.

93. Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 753 (1989) (finding that the intention for the contributions to be inseparably or interdependently merged must be present when the parties "prepared the work[,] as opposed to between when it was created and before the business venture has concluded, where a dispute could arise").

94. 17 U.S.C. § 101 (providing that joint works must be prepared "with the intention" that they "be merged into inseparable or interdependent parts of a unitary whole").

95. *See* Naomi Zener & Prudence Etkin, *Prenups of the Copyright World? Issues to Consider in Joint Authorship & Copyright Co-Ownership Agreements*, BERESKIN & PARR (Nov. 10, 2021), https://bereskinparr.com/news-insights/insights/prenups-of-the-copyright-world-issues-to-consider-in-joint-authorship-copyright-co-ownership-agreements/ (discussing that "[t]here is a presumption that each creator owns an equal undivided interest in the copyright" and "unanimous consent of the co-owners is required to exercise exclusive rights or assign the copyright").

96. *See* Ardani et al., *supra* note 85, at 352 (discussing how "the architect will submit the model to the owner to be used" but in most cases the architect will intend and prefer that this is done "through a license" and that they remain "the copyright owner of all drawings, models, and intellectual property" that they create).

affirmative evidence that the parties intended to merge their contributions.[97] While BIM technology is naturally collaborative, these characteristics do not presumptively evidence the desire for a permanent, inseparable merging of designs by all parties.[98] That said, courts should remain lenient and generally find implied licensing with the copyrighted designs, especially in light of policy considerations on how the construction industry actually functions.

B. Liability Concerns: Contract Development and Technological Adaption

The primary area where liability issues arise in a BIM project, at least as distinct from traditional construction law, is at the border of the design development stage and the construction coordination stage; when the handoff from design to construction is more ambiguous, especially if the contractor has input or involvement during design, the allocation of risk and placement of liability becomes more complicated.[99] It is therefore extremely important for parties to carefully define their relationships.

Parties should begin more deeply defining their business relationship through contracts.[100] In many cases, standardized documents do not adequately address the presence and effects of BIM technology. Therefore, parties should engage in careful contract editing to ensure the roles and responsibilities of all parties to a project are clearly defined.[101] Additionally, parties should track additions to the field of standardized guidance documents, such as those drafted by the American Institute of Architects ("AIA"), which is in the process of making more helpful and widely applicable contract documents to aid BIM project contracting.[102]

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97. *See id.*

98. *See id.*

99. John Bleasby, *Legal Notes: BIM Creates New Challenges to Liability Risks and Intellectual Property Rights*, CONSTRUCTCONNECT: DAILY COMMERCIAL NEWS (Dec. 9, 2020), https://canada.constructconnect.com/dcn/news/government/2020/12/legal-notes-bim-creates-new-challenges-to-liability-risks-and-intellectual-property-rights (finding that it is very difficult in some cases to identify who is responsible for errors after roles and responsibilities are blurred and intertwined within a BIM).

100. *See generally* Bodea & Purnuş, *supra* note 6, at 69.

101. *See id.* (asserting that "[w]hat is even more relevant than standard contract forms is the understanding of how contract deals with the legal issues affected by BIM," including "clash detection, early warning and risk management [sic] [and] intellectual property rights").

102. *See, e.g.*, *Introducing AIA Contract Documents'* 2022 *BIM Documents*, AIA CONT. DOCUMENTS, https://learn.aiacontracts.com/articles/6523765-introducing-aia-contract-documents-2022-bim-documents/ ("In July 2022, [Autodesk] released new BIM and digital delivery documents to replace the 2013 BIM documents" that

The addition of BIM to a project can cause substantive legal changes in the relationship between parties and the allocation of risk, so parties should make every effort, both on their own and with the help of other organizations like the AIA, to engage in careful and precise contract drafting.[103]

Additionally, parties should adopt modern technology that allows them to further manage risk where possible. Similarly, owners should include this as a provision in the original contract documents where feasible to reduce the chances of disputes. For example, while blockchain technology is traditionally thought of in the sphere of virtual currencies, it also has the ability to track, manage, and organize information in a construction project.[104] More importantly, blockchain can be used to track changes to a model, including who makes changes and when.[105] Because most BIM technology automatically updates the model to reflect the full scope and effect of changes within it, blockchain has the potential to define which changes caused errors to arise and identify the party responsible.[106]

While this is a novel application of blockchain technology, it has enormous potential to address and manage many liability concerns by parties within a BIM project; therefore, parties should adopt its use whenever possible — and when feasible, considering how recent this development is.[107] Additionally, if BIM disputes do make it to litigation, this provides parties with extremely detailed information regarding the responsibilities and actions of each party, which would be necessarily helpful in the fact-specific hearing a court would hold to determine issues including liability and breach of the standard of care.

"streamline the documentation process and reflect current practices.").

103. *See* Bodea & Purnuş, *supra* note 6, at 69 (discussing how contracts are a primary method of clarifying information that may otherwise lead to disputes later in the construction project, especially when implicating legal risk and liability for errors that arise).

104. Ziga Turk & Robert Klinc, *Potentials of Blockchain Technology for Construction Management*, 196 PROCEDIA ENG'G 638, 638 (2017) (discussing that, "[o]n the construction site, blockchain can improve the reliability and trustworthiness of construction logbooks, works performed, and material quantities recorded").

105. *Id.* at 642.

106. *See id.* (finding that blockchain may be able to create an "immutable public record of all modifications" to a BIM and be a "useful tool for managing and recording [these] changes" within the project as a whole).

107. *See id.* at 644 (asserting that "[b]lockchain has the potential to address some issues that discourage the industry to use BIM[,]" including "inter-organizational recordkeeping" and "change tracking" within a project).

There are also liability concerns held by many parties regarding the responsibilities one has in a project.[108] For example, while an individual acting in a certain capacity (e.g., architect, engineer) naturally carries responsibility for that role, there is often confusion as to who holds responsibility for detecting clashes between different designs.[109] Furthermore, concerns arise regarding the extent to which each individual party may carry responsibility to the quality and feasibility of the model as a whole, which implicates work from a variety of design professionals.[110]

As far as liabilities external to model outputs and delegated responsibilities, the *Spearin* doctrine is the primary remaining concern for parties to the project, particularly the general contractor. However, this concern is overstated.[111] *Spearin* has always come with its substantive limitations, requiring that a contractor be sufficiently separated from the design process to be barred from liability.[112] As such, courts can simply treat BIM projects under the fact-specific inquiry that has always been inherent to the *Spearin* doctrine, though potentially faded because contractors do not often substantially contribute to the design process. That is, courts should weigh the involvement of contractors in the earlier stages of a BIM project: if they are highly involved and contribute ideas or work to the design, *Spearin* protection should erode to some extent, but if they remain substantially separated and only provide advice to the extent asked in a normal construction project, then *Spearin* protection should remain in full force.

Contractors should also weigh such a fact-specific analysis of their conduct *before* the project begins to manage their own risk and liability. Contractors are often not insured for professional or design liability, so they need to carefully exclude themselves from the design process or, if

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108. *See generally* Su-Ling Fan et al., *A Critical Review of Legal Issues and Solutions Associated with Business Information Modelling*, 24 TECH. AND ECON. DEV. OF ECON. 2098, 2109–12 (2018).

109. *See id.* at 2109 (discussing how BIM models are generally capable of updating automatically, but questions can arise as to who the "designer" responsible for an error is; when all the design professionals had access to the clash detection, none took a lead to find and address clashes).

110. *See id.* (discussing how BIM models generally lead to questions regarding each designer's responsibility for coordinating the model with other designs and each designer's extent of responsibility for ensuring other designs fit appropriately within the model, a role which is often best fit for a separate individual (a model manager) to assume this risk clearly but often is left ambiguously to the design professionals).

111. *See generally* United States v. Spearin, 248 U.S. 132 (1918).

112. Jiang et al., *supra* note 54, at 5 (explaining that contributing to the design elements and process often erodes the contractor's protection from liability if defects are present in the specifications given to him).

they wish to be involved, manage liability risk in other ways like through professional service insurance.[113] In addition, contractors should continue to engage in careful contract drafting to reduce general liability because their contracts will be the primary governing document of their standard of care and responsibilities, as well as the primary evidence courts use to determine responsibility and cases of negligence.[114]

IV. RECOMMENDATIONS: EXTENDING PRECEDENT, PLANNING CAREFULLY, AND UTILIZING TECHNOLOGY

Multiple parties within a BIM project have ownership concerns, particularly over intellectual property, with design professionals preferring to retain their creations and owners wanting sufficient transfer of rights so that they will have freedom to alter or reuse designs.[115] Parties should attempt to resolve these disputes via contract whenever possible, but cases where ambiguity arises ordinarily occur in all contracts and thus, BIM disputes will undoubtedly arise.

When courts analyze the relationship between the parties of a BIM contract, they should find that the work of design professionals does not qualify as a work made for hire as an independent contractor because the works are architectural.[116] Additionally, courts should ordinarily find that works do *not* qualify as works made for hire under an employment relationship, given the freedom and independence design professionals ordinarily have within the scope of the project's specifications, unless evidence indicates otherwise.[117]

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113. *See* Ashcraft, *supra* note 1, at 9 (discussing how "[c]ontractors also face insurance issues[,]" given "most standard commercial general liability policies exclude professional services and do not cover purely economic loss[,]" which may need to be a consideration for contractors as they "become more deeply embedded in the design process" of a BIM model).

114. *Understanding Standard of Care Issues in Construction Claims*, EXPERT INST. (June 23, 2020), https://www.expertinstitute.com/resources/insights/understanding-standard-of-care-issues-in-construction-claims/ (discussing general responsibilities that arise for contractors in light of the AIA 201 General Conditions of the Contract for Construction and how these responsibilities translate into the standard of care within a construction project).

115. *See generally* Azhar, *supra* note 14, at 250 (discussing the competing outcomes of intellectual property within a BIM project, depending on the nature of the relationship between the parties involved).

116. *See* 17 U.S.C. § 101 (showing architectural works do not appear in the categorical list that Congress provided in designating works made for hire for independent contractors).

117. *See id.*; *see also* Cmty. for Creative Non-Violence v. Reid, 490 U.S. 730, 751 (1989) (providing the non-exclusive list of factors for considering the presence or lack of an employment relationship, several of which focus on the autonomy of the hired

Additionally, because design professionals have interests in retaining their intellectual property, and therefore would be unlikely to intend for it to become an inseparable part of the model, courts should not treat the copyrights within the BIM model as a joint work.[118] For these reasons, copyrights should be treated in their traditional form and therefore be retained by design professionals unless they are explicitly transferred or assigned in writing; however, given policy considerations regarding the industry, as well as precedent in support of doing so, courts should be lenient in the finding of implied, non-exclusive licenses when the project is of a collaborate and interdependent nature.[119] This constitutes a fair compromise between the rights of owners and the desires of design professionals, consistent with both legal precedent and traditional policy considerations.

To address the liability concerns that occur in BIM collaboration, especially at handoff between parties, parties should engage in extremely precise and detailed contract drafting to accurately describe and draw boundaries between their relationships.[120] As standardized BIM contracts become more widely applicable and useful, parties can also consider using them as guidelines for BIM projects. Furthermore, parties should take every reasonable effort to adopt new technological adaptions that manage legal risk, particularly blockchain and other digital ledger technology, to track and store information on changes made to the model, the party making these changes, the effects those changes have on the overall model, and potential issues that arise as a result of these changes.[121]

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party in completing his work even if they need to work within certain project specifications).

118. *See* Zener & Etkin, *supra* note 95 (discussing the equal, undivided interests in each co-owner that result in joint tenancy, which is the legal basis of a jointly owned copyright).

119. *See* 17 U.S.C. § 204(a) (requiring a written and signed instrument of conveyance for the copyright to be validly transferred); *see also* Effects Assocs., Inc. v. Cohen, 908 F.2d 555, 558–59 (9th Cir. 1990) (finding that non-exclusive, implied licenses are commonly present when the work is of minimal value without them, indicating prior intent to license the work).

120. *See* Bodea & Purnuş, *supra* note 6, at 70 (discussing the legal importance of deciding the "amount of BIM data to be included in a construction contract[,]" "defining appropriate clauses to incorporate BIM data and models into a construction contract[,]" and "formulating and establishing standards or guidelines for procuring BIM services, including the scope of service" prior to getting deep into the construction process where disputes may arise).

121. *See* Turk & Klinc, *supra* note 104, at 638 (finding that "blockchain can provide a trustworthy infrastructure for information management during all building life-cycle stages[,]" including for "who did what and when[,]" therefore providing "a [factual] basis for any legal arguments that might occur").

For liability outside the scope of changes and errors, primarily relying on standards of care, courts should continue to rely on traditional, highly fact-specific precedent in their analyses. Even older precedents like *Spearin* have applicability to modern BIM projects, defining the scope of a general contractor's involvement as a primary factor in determining whether they have increased responsibility for errors.[122] Courts can continue to extend this precedent, which can still properly govern in the modern age, while parties can continue to adjust their conduct and their contracts to create the fact-specific evidence that manages legal risk if disputes ever reach litigation.[123]

V. CONCLUSION

BIM technology can bring enormous benefits to a complex construction project for all parties.[124] Despite the legal uncertainties that many parties believe surrounds BIM, there are methods to reduce that uncertainty and promote the widespread use of BIM throughout the construction industry as a whole.[125] Specifically, courts should extend traditional precedent governing liability and copyright ownership in the next available case to dispel the uncertainty created by a lack of modern precedent.[126] In the meantime, parties should undergo extremely precise drafting in their contracts when defining their relationships and responsibilities, as well as utilize modern technology like blockchain to further collect and store information that aids them in tracking, managing, and controlling legal risk.[127] With courts and parties taking these respective steps, the utilization of BIM can become more widespread, and the reaping of its benefits can be

122. *See* Jiang et al., *supra* note 54, at 5 (discussing the scope of involvement by the contractor at the design phase as relevant to a *Spearin* and liability analysis because engaging in consultant-like behavior can constitute an assumption of risk and liability).

123. *See generally id.*; Turk & Klinc, *supra* note 104, at 638.

124. *See generally* Ashcraft, *supra* note 1, at 6–8 (listing briefly many of the benefits and advantages that come with using BIM in a complex construction project).

125. *See id.* at 4–6 (listing the many legal issues that concern parties in deciding whether to adopt a BIM in a complex construction project).

126. *See generally* United States v. Spearin, 248 U.S. 132 (1918) (creating precedent limiting liability for general contractors in traditional construction projects from defects arising during the design phase); *see also* 17 U.S.C. § 101 (including provisions on the nature of the relationship between design professionals and project owners, which substantively affect copyright rights).

127. *See* Ashcraft, *supra* note 1, at 10–12 (discussing the importance of precise contract drafting in ameliorating the legal concerns associated with BIM); *see also* Turk & Klinc, *supra* note 104 (discussing the benefits of using blockchain for information management).

maximized, leading to substantial benefits for all parties within a project as well as within the construction industry as a whole.