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Insights

AI AND THE CONSTRUCTION INDUSTRY

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SUMMARY

In this Insight, first published in PLC Construction, Anna Blest, Sasha Rubinstein, Jack Mcfadden and Tiffany Babayemi consider the key takeaways from the RIBA Artificial Intelligence Report 2024.

This article contains some links which are only accessible by PLC subscribers.

Rapid advances in artificial intelligence (AI) have overhauled business models in many sectors. With productivity in the construction industry lagging behind other sectors, does AI present opportunities to innovate and increase efficiency?

The recent report on AI, including generative AI, by the Royal Institute of British Architects (RIBA) goes some way towards answering this question. RIBA has been monitoring AI developments in the architectural field and its February 2024 report (Report) explores the impact of AI on the profession and the risks associated with the use of AI in the construction industry.

The Report revealed that out of 500+ RIBA members, 41% of UK architects are already using AI in their projects. This follows adoption of technologies to manage contractual obligations, use of Building Information Models (BIM) and smart contracts (blockchain), as well as Computer Aided Design (CAD) and growing use of IoT sensors. RIBA reports increasing use of generative AI, particularly in the context of the development of "digital twins". At present, the UK has no AI-specific legislation, but users of AI tools should bear in mind the UK's principles-based AI framework.

This article explores the key opportunities and challenges of using AI in the construction industry, as well as key intellectual property (IP) rights considerations. References in this article to AI are to both traditional and generative AI, as appropriate.

For more information on:

- RIBA's Report, see RIBA Artificial Intelligence Report, 29 February 2024

- The UK's AI framework, see the government's response to its consultation on "A pro-innovation approach to AI regulation", February 2024 and BCLP's Insight, Digital Speaks: Regulation of AI Systems in the UK and EU

- AI generally, see Toolkit, AI toolkit (UK).

- Blockchain and smart contracts, see Toolkit, Blockchain and digital assets toolkit and Practice note, Blockchain, DLT and smart contracts: an introduction.

- BIM generally, see Practice note, Building information modelling (BIM): an overview.

OPPORTUNITIES FOR AI

The Report identifies several main ways in which AI can be used to improve building design and the use of space whilst simultaneously limiting negative effects to the quality of life of individuals, or the environment.

USE OF DIGITAL TWINS FOR URBAN REGIONS

The Report notes that the construction industry typically leaves the design, location and performance of human-built habitats to be led by real estate developers and the restrictions of urban planning codes, many of which are arguably decades out of sync with present and future human needs.

The use of digital twins enables the creation of an electronic model comprising several classes of analytic, simulation and visualisation technologies that use and generate, numeric, descriptive and 3D data to test-drive policies and design criteria. Architects designing urban regions are able to simulate how to achieve the optimum social, economic, mobility, energy, water-use and other climate-related environmental outcomes.

When designing urban regions architects can use digital twins to interact with a virtual model reflective of the complex components of an urban region, such as people's health and wellbeing, education, employment types, energy generation and consumption, food, water, air-quality, greenspace, Net Zero and carbon neutrality, infrastructure, and mobility. With AI working within these parameters, architects have the opportunity to put their know-how and creativity to good use and collaborate with client and stakeholders on these digital models that go well beyond BIM systems. The report also identified that better use of digital twin technology would allow on-going performance analytics to determine whether a design solution delivered the advantages sought.

COMPLEXITIES OF DESIGNING AND BUILDING MODERN BUILDINGS

The Report notes that 49% of architects agree that because modern buildings are becoming increasingly complex in their design, construction and maintenance, the profession will need more innovative tools and AI may offer advantages. For those already using AI, 43% agree that AI has improved efficiency in the architectural design processes, while 24% disagree. Perhaps the less positive outlook on AI stems from the fact that current AI tools are not yet sufficiently developed for use in the architecture profession or are being integrated into teams that lack the training to make the most of them. Like most industries, it may take some time for the benefits to materialise within the construction industry.

With generative design tools, AI algorithms generate and optimise design solutions based on criteria such as space requirements and aesthetic preferences to optimise building performance and predict energy use, daylighting, thermal properties, conduct structural analysis, analyse loads and optimise designs for maximum strength and safety.

As with any profession, architects are under significant pressure to remain profitable while also adhering to modern standards of construction. The power of AI can be harnessed to progress design processes more cheaply and efficiently so that architects can price their services more competitively.

The Report also identifies a role for AI in project management (such as cost information and modelling, project scheduling, fee calculation and contract management) which could drive significant cost and time efficiencies.

IP PROTECTIONS FOR ARCHITECTS

Typically, the most critical IP for the architecture industry is copyright. Original architectural designs (including plans, CAD drawings/models) are valuable assets that enjoy the same protection under UK copyright law as any other copyright work. Copyright in architectural works can be monetised through licensing or assignment to developers.

When drafting a contract with an architect, the definition used to describe the copyright works should adequately capture all the material that the architect may produce, which the developer wishes to use (bearing in mind the later management, operation and maintenance phases of the building). Where the architect is using AI technology to deliver a digital twin model, the developer should ensure it is granted a right to use the model for the purposes of the development, as well as any licence to use third party software or AI tools underpinning the digital twin, and that this use right matches the developer's needs over the lifetime of the development and during the use and occupation phase.

Particular consideration should be given to whether the licence scope extends to use by sub-contractors, for instance, to allow for other third parties to have access to the software for the purposes of the project, as well as whether any AI tool used to develop project materials can still be

utilised at the end of the project. The contract should also make clear that this right continues notwithstanding the expiry or termination of the contract, for instance, for developing future extensions to a building.

For further exploration of these issues, see:

- Blog post: Copyright in construction: some common queries.

- Practice note, AI and copyright.

CHALLENGES OF AI

CHALLENGE 1: TRAINING AN AI MODEL – DATA INPUTS

AI models require training, which is usually achieved by exposing them to very large data sets that are then used by the model on a predictive basis to generate outputs. As such, improper sourcing of data sets by the AI model developers risks the models being trained on materials which are protected by copyright (and other IP rights). We are already seeing copyright owners mounting legal challenges to AI companies, alleging infringement of copyright and database rights through the unlicensed use of their data for AI model training purposes. If IP rights are infringed during the AI model training process, then the responsible person would be the person training the AI model. The Report also discusses how safeguarding specialist data might become a key objective for the architectural profession, to prevent copyright plans and designs being used without payment to train AI models.

AI also typically learns a "centralising tendency", which means such tools may ignore outlying data points. The more general purpose and large-scale commercial AI tools may therefore have a mass use function which is at odds with the specialist and applied knowledge of an industry, such as the construction industry. If developing a specific architecture-led AI design tool, ensure third party IP rights are not infringed at the data-input stage by procuring necessary licences from the owners of the data being used to train it.

CHALLENGE 2: OUTPUTS OF THE AI SYSTEM

Legal systems worldwide are grappling with concepts of ownership of works created by generative AI tools. Several jurisdictions will not protect AI-generated works as copyright works as they assert that only works created by a human can be protected by copyright. In the UK, for computer-generated works where there is no human author, the person overseeing the creation process is recognised as the author because they are deemed to be closest to the creation of the work. This concept also extends beyond computer programs to include computer-generated industrial or architectural drawings. The work still has to meet the originality test, which requires that the work is the "author's own intellectual creation". It may therefore be difficult for an AI-created work to be considered "original". Separately, the moral rights of attribution and integrity do not apply to

computer programs or any computer-generated work. The question is what then happens if an architect creates plans or designs generated by an AI tool.

For further commentary on moral rights and construction contracts generally, see Blog post: Moral rights: why should developers care?

Some AI tools offer users an indemnity against third party IP claims. However, there is still a risk that the designs produced by generative AI tools may be poor quality or fail to adhere to applicable building standards. The output may also not be protected by copyright (affecting the ability of an architect to assign or license such plans to a developer) if there has not been sufficient human input. Developers may therefore want to seek warranties around the extent of AI usage and the ability of the architect to assign or license the works.

CHALLENGE 3: LIABILITY AND INSURANCE

Another crucial consideration centres on liability and insurance. Just as AI systems cannot be said to be "authors" in the way that individuals can, without a separate legal personality an AI tool also cannot be held liable for defective building design.

The person deploying the AI tool is therefore likely to be held responsible if the output of the tool is defective or inaccurate. The Report reminds us that architects have to hold professional indemnity (PI) insurance and absorb the risk of performance and failure produced as a result of the use of AI in their work. Developers should therefore agree with their architects in advance on the extent of the role that AI should play in the development of architectural designs and plans, to mitigate risks around AI usage.

For more information, see Toolkit, AI toolkit (UK): Liability.

CHALLENGE 4: CONTRACTUAL IMPLICATIONS

With the increased use of AI within the industry, it is important that the parties consider the implications on the underlying contractual provisions and that these are tailored to the particular AI use on the relevant project. As it is common within the industry to see protocols and contractual obligations relating to the use of BIM, it is likely that the use of AI will need to be reflected in the contractual documentation. Key considerations include clarity over roles and responsibilities, collaborative working principles, relevant protocols and consequences of non-compliance.

CHALLENGE 5: OVERRELIANCE ON AI

The Report also considers whether overreliance on AI might lead to the erosion of skills of junior generations entering the industry and whether insufficient human oversight could lead to unchecked errors in AI-generated designs or to designs that unintentionally imitate copyright works (due to the input data the AI model was trained on).

This conundrum is not confined to the field of construction of course but generally arises in relation to the advance of AI in all sectors.

The answer is that we simply don't know what the long-term effects of increased AI usage will be on employment prospects in the construction industry. The hope of course is that industry benefits from the many advantages that AI has to offer while serving to evolve and grow human expertise and creativity in tandem and of course it is very likely that in 20 to 30 years' time, different but nonetheless valuable human skill sets will be needed in this field.

CHALLENGE 6: THREAT OF JOB DISPLACEMENT

The hesitation to embrace AI may stem from uncertainties about how it can disrupt traditional roles within the industry, particularly with the threat of job displacement for architects. The Report states that 58% of architects think AI presents a risk of imitation, and if an AI tool can easily generate plausible design imitations that can be readily passed off as the work of another architect, the creative foundation of the profession may become vulnerable. However, many believe that AI tools will ultimately serve as an assistant in design processes, with architects retaining their role as final decision-makers considering the cultural, regulatory and aesthetic concerns that are crucial to stakeholders.

TAKEAWAYS

As the Report highlights, it is essential to approach AI with a critical yet optimistic mindset. As with other industries working to implement technologies, the construction industry must find the balance between investing in the innovative potential AI can bring, while ensuring that accountability and liability for use of generative AI is addressed appropriately. In general, the RIBA findings align with our Annual Arbitration Survey of 2023, focusing on AI in IA, which found that the most common words to describe the respondents' views on AI in arbitration were "inevitable", "cost effective" and "opportunity".

For more information, see Legal update, BCLP Arbitration Survey 2023 on AI in international arbitration: key findings published.

This article was co-authored by Tiffany Babayemi.

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