



## **Combating Modern Slavery in the Construction Sector with Integrated Technologies to and Related Barriers**

### **Authors**

Anwyn Shoemark<sup>1\*</sup>, Roberto Minunno<sup>1,2</sup>

<sup>1</sup> Curtin University, School of Design and the Built Environment, Kent Street, Bentley, Western Australia, 6102; [anwyn.shoemark@postgrad.curtin.edu.au](mailto:anwyn.shoemark@postgrad.curtin.edu.au)

<sup>2</sup> Curtin University Sustainability Policy (CUSP) Institute, Kent Street, Bentley, Western Australia, 6102; [roberto.minunno@curtin.edu.au](mailto:roberto.minunno@curtin.edu.au)

\* Corresponding author

### **1. Introduction**

Our research conducted on modern slavery and the construction industry addresses the increasingly important question of how modern technologies such as blockchain and its applications can be used to combat and prevent modern forms of slavery and what are the fundamental limitations of these technologies, contributing to addressing the Sustainable Development Goal 8 – Decent work and economic growth, and the related target 8.7 – Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms. To date, searches on the most popular academic databases, such as Scopus, highlight a substantial gap in academic research on modern slavery in the built environment (which, perhaps, reflects a gap in the industry and regulations), questioning what role architects have in addressing contemporary forms of modern slavery in the built environment and the construction sector. Problematically, a lack of studies on modern slavery in the architecture and construction sector does not prove the absence of this phenomenon. On the contrary, modern slavery is present in many of our societies' operations, albeit well hidden. The complexity of building components and their materials' supply chains make them susceptible to the threatening inclusion of modern slavery-related operations, such as forced displacement, passport confiscation, debt bonded labour, forced labour, human trafficking, child trafficking and child slavery.

Our research applies the circular economy lenses to the current industry gaps, barriers, and technological solutions to address this substantial societal issue. More specifically, we investigate how circular economy implementations, such as traceability and provenance interlinked with blockchain technologies, can enable the establishment of a material tracking and certification platform. The widespread adoption of such a platform would, in turn, ensure the fairness of materials production across the supply chain of building materials. Our submission explores six critical limitations to the applications of modern technologies to combat slavery in the built environment, namely, 1. Lack of certifications for human rights in construction materials, 2. Lack of performance-based human rights measures for the construction and architecture industry, 3. Frequent Substitution of Building Materials, 4. Lack of governmental support in preventing modern slavery in infrastructure and construction projects, 5. Lack of industry support and professional awareness of modern slavery, and 6. Technological limitations of the digital twin in building design. It concludes with recommendations related to the Australian context of the construction industry and the built environment. It is

critical to underline that the findings discussed in this submission were obtained through focussed interviews. Considering the scarcity of academic literature on modern slavery in the construction sector, the number of references is consequentially limited, despite our best efforts to populate our bibliography. Finally, the professional experience of the Authors (graduate architect and a structural engineer with several years of experience in sustainable operations) was critical to crafting this article.

## **2. What are the existing limitations and challenges in using blockchain technologies, and what recommendations do you have to overcome them?**

### *Limitation 1. Lack of certifications for human rights in construction materials*

Overall, industry responses emphasised that everyone involved, from the design stage to building completion, should be responsible for mitigating human rights violations. All actors in the supply chain play an essential role in combating modern slavery in the construction industry. Still, our investigation resulted that the role of architects was considered significantly placed to manage their building specifications and product selections and, where possible, filter out and boycott products to ensure ethical sourcing for human rights. However, the limited ethically conformed products available need to be clarified by the need for more material certification in human rights preventing any legitimate and informed response from the architects. In other words, for architects to make informed decisions, supply chain certifications for human rights are a substantial limitation that should be addressed. Modern technologies such as blockchain could support such an informed decision-making process.

### *Limitation 2. Lack of performance-based human rights measures for the construction and architecture industry*

To overcome modern slavery in the construction sector, it resulted from our interviews showed that buildings must incorporate a performance-based measure for social provenance and human ethics. A performance-based approach is needed to establish a tangible and user-friendly way to understand human ethics that can be specified by the architect or a client and mutually understood in contractual terms. Incorporating human ethics into a completed building or during the design is not currently feasible. It emerged in our research that initiatives for human rights need to be explicitly linked in behavioural economics terms; we need to look for initiatives that co-locate human rights in the bottom line and executed at a contract-based level. That way, human rights due diligence becomes a piece of the construction and infrastructure procurement evaluation. Therefore, a human rights performance-based approach is necessary for building design and construction projects. The concept of reducing the value of a building to simplified performance-based numbers is well-established in Architecture. Such a performance-based approach could be drawn from existing systems. For example, R-value refers to a building's insulation properties and ranges between 1.5, least efficient, and 7, most efficient thermal insulation (Standards Australia & Standards New Zealand, 2018a). Another well-known example is the Bushfire Attack Level rating covering a range known as flame zone (Standards Australia & Standards New Zealand, 2018b). This simplified numerical fire rating impacts a building's design and its selections. Both examples ensure that a building legally complies, is safe for use and is fit for purpose. This approach is currently lacking and must be

extended for human rights in building design. As explained in this section, blockchain technologies could be implemented with a performance-based approach.

### *Limitation 3. Frequent substitution of building materials*

Another significant challenge facing implementing ethical materials in architecture is the frequent material substitution of construction products. The Australian Building Product Innovation Council guidelines on managing product substitution explain that substitutions can occur for many reasons. Lack of local availability, easier installation, lack of trained tooling, managing time, and purposefully choosing lower cost but similar performing materials (Hills, 2017). The substitution of building products in Australia, such as asbestos-contaminated roofing material, has resulted in legal noncompliance for notable projects, such as the Perth Children's Hospital (Australian Broadcasting Corporation, 2016). The current guidelines around material substitution show that until a human ethics value can be specified by an architect and assigned to a building during the design stage, material substitution will be questionable and, in turn, unable to address human ethical risks found in the supply chains of building materials. Without a social performance-based measure for building materials, materials could be freely substituted, as there is no requirement to comply with them. A performance-based measure for human rights in building materials is needed to address this to prevent the substitution of materials with unknown social provinces.

### *Limitation 4. Lack of governmental support in preventing modern slavery in infrastructure and construction projects*

If technological options become available to aid the built environment sector, government regulation will still be required to ensure professional due diligence. Outcomes revealed that some participants felt that architects reflected the very end of the supply chain. When coupled with project cost-cutting, the ability of architects to advocate for human rights, as one participant described, was a "small role to play". There was also genuine concern that additional regulations would stymie architectural practice, as this would create additional time burdens on already tight project budgets. Others noted that architects should not be held responsible for vetting their selections. A top-down approach must be made responsible at a practice level, where the government enforces business to address this issue through legislative controls.

As highlighted by two of our key interviewees, human rights organisations have identified modern slavery as a critical concern that the architecture profession needs to address due to the closely intertwined relationship between building design, architecture, materials, and construction. Concerningly, the Commonwealth's legislation's focus on self-reporting and the requirement for significant earnings preclude most architecture and firms from ever considering modern slavery risks. This is coupled with a minority of built environment practitioners who will only respond to modern slavery requirements if they are legally required. This underscores that the Australian state and federal governments need to play a more significant role in the future monitoring and policing of modern slavery in construction projects if the architectural practice is to address this issue. Technology-based solutions alone will not be enough to address modern slavery's pervasive influence over the built environment value chains.

#### *Limitation 5. Lack of industry support and professional awareness of modern slavery*

Technological solutions and uptake will be hindered by professionals' lack of awareness of modern slavery risks on their projects. Research findings from the interviews and survey revealed that most of the leading bodies of our profession, architectural firms, and architects themselves, had never really considered the aspect of the social province and human rights in supply chains meaningfully. As a result, many in the profession felt unable to contribute or were challenged by the divergent nature of topics and wanted to refrain from participating when invited. International interview participants were able to approach the topic more openly, likely due to greater exposure and awareness of modern slavery in their country. Overwhelmingly practitioners expressed the need to have greater access to education around modern slavery at a university level, but also further training targeted at an industry level. Technology should be supported by simultaneous access to improved education, enforced contractual obligations and more critical legal requirements.

#### *Limitation 6. The digital twin in architecture and construction*

Current BIM practice in architecture is based on creating a digital twin used to design and document representations of buildings and their material selections and specifications. A significant limitation of BIM practice is that the documented building only represents the building that will be constructed and completed. The inability to directly link the BIM model to the physical built form often results in material substitution, and the final building may not represent the BIM documented design. To overcome this issue, it is necessary to include a tracer in every material at each stage of its life cycle through the supply chains. Technological advancements of the digital twin in building design could include information like material tracing through distributed ledgers to be updated in the model once installed onsite and verified. This could close the gap between what is designed and specified by the architect and what is constructed on-site and allow the building to be designed and constructed for performance-based human rights design requirements.

### **3. Recommendations and Conclusions – Technological solutions lie within the circular economy**

Solutions offered point to manufacturers taking greater responsibility for human rights standards in the supply chains and architects needing better technological solutions that can be used in-house when planning and designing a building to mitigate modern slavery. Transparency to help understand the origins of products was underscored as critical to achieving this ethical objective. Therefore, the researchers believe that the technological solutions for addressing modern slavery in the construction sector lie within a circular economy-based approach to material tracing from extraction to grave. Unfortunately, the importance of supply chain management in architecture and construction is presently considered from an environmental approach rather than a broader approach to human rights. However, if materials could be traced with distributed ledgers across the complex global supply chains and integrated into architectural digital twin practice, this would achieve cradle-to-grave life cycle management and provide true transparency of building materials, capturing not only their environmental origins but also social provenances.

To conclude, the findings summarised reflect ongoing research and demonstrate that significant barriers exist to addressing modern slavery implications for architectural practice and that technological solutions for modern



slavery will not be enough in the construction sector. Further research, policy and industry practice changes are needed in this space to address the limitations. We hope that the finding summarised here from our research shed light on the resealed area of modern slavery and the construction and architecture industry regarding limitations to technologies used to address modern slavery and can be used to inform the Special Rapporteur on contemporary forms of slavery, including its causes and its consequences.



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