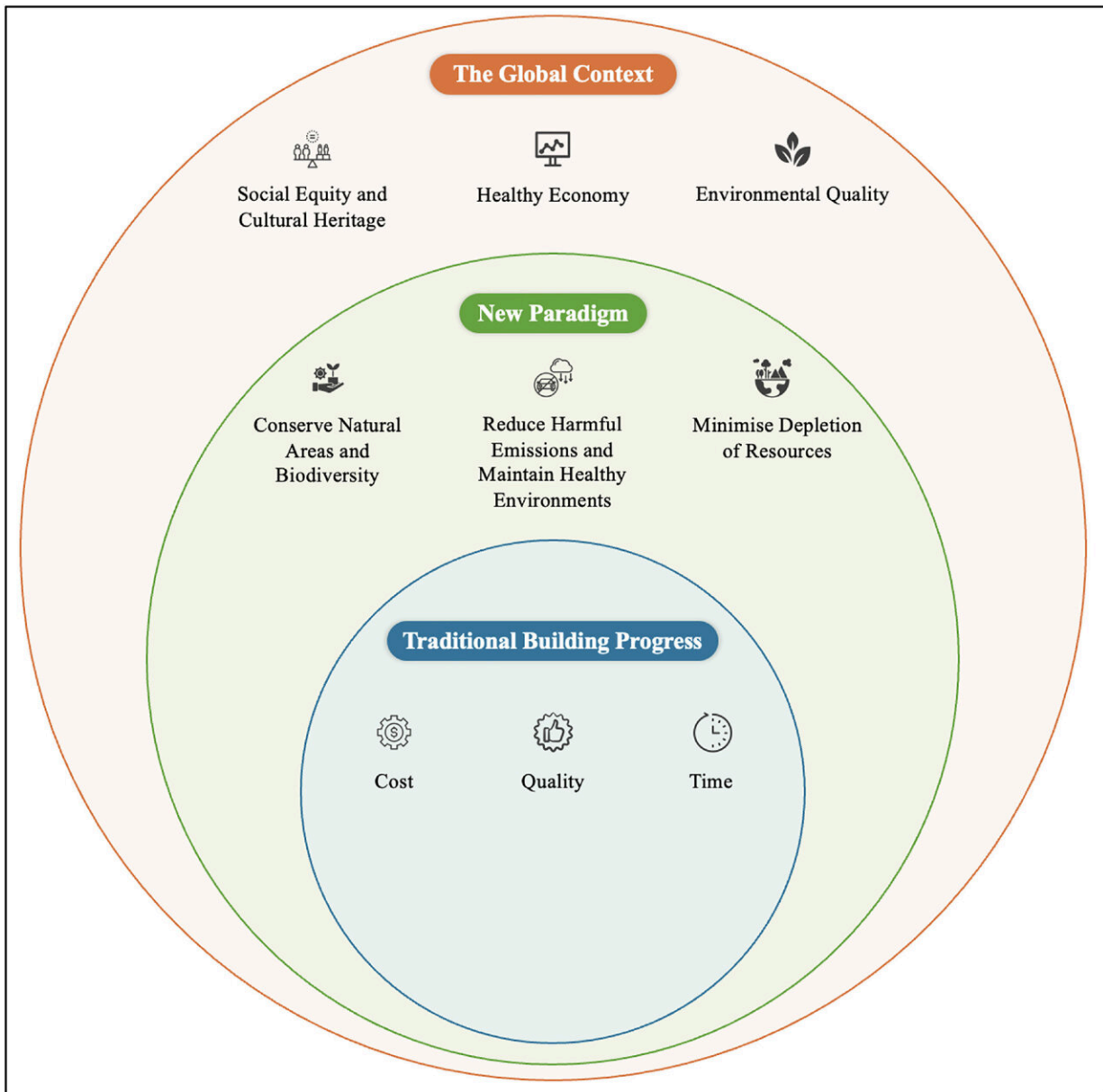


Reaching new heights: AI can help us build better buildings

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Challenges of sustainable construction in a global context. Credit: *Sustainable Cities and Society* (2024). DOI: 10.1016/j.scs.2024.105499

The application of artificial intelligence (AI) has the potential to revolutionize the hands-on construction industry and contribute to long-term environmental sustainability in our built environment.

A literature review out of City 4.0 Lab's Urban AI Hub in the QUT School of Architecture and Built Environment has found its implementation will contribute to multiple UN Sustainable Development Goals (SDGs) including [clean energy](#), [sustainable cities](#) and climate action.

The [article](#) "Artificial intelligence and sustainable development goals: Systematic literature review of the construction industry" is published in *Sustainable Cities and Society*.

The study's first author Ph.D. researcher Massimo Regona, who conducted the research alongside Professor Tan Yigitcanlar, Dr. Carol Hon and Dr. Melissa Teo, said the construction industry is "one of the major polluters" in Australia.

"However, significant efforts are being made across the sector to align with sustainability principles by incorporating green building standards, using sustainable materials and adopting [innovative technologies](#)," he said.

Analyzing 91 publications—78% of which were published in the last three years suggesting heightened interest—the study explored how AI could be integrated across key project phases to enhance sustainability.

Across the SDGs pertinent to the industry, the research suggested AI could optimize [energy usage](#) in building designs through predictive modeling and energy simulation, while also promoting sustainable consumption and production practices by optimizing resource utilization and waste reduction.

Its use could also improve supply chain efficiency, workforce productivity and stakeholder engagement, contributing to broader sustainability goals.

Additionally, AI-driven technologies such as [machine learning](#) and [natural language processing](#) was shown to improve the collection and analysis of sustainability data, enabling proactive responses to emerging issues.

In an increasingly digital world, construction remains hands-on and low-tech. While there has been some uptake of AI in the field, Regona said its application is limited due to a lack of expertise, cost concerns and the industry's traditional reliance on human labor.

"There is growing curiosity in leveraging AI to optimize construction phases through site surveying, predictive analytics, automation and smart construction materials," he said.

"Some companies appreciate that these innovations have the potential to transform traditional practices into more efficient and sustainable methods."

Speaking on effective implementation, Professor Yigitcanlar said that future efforts should first prioritize understanding the challenges construction companies, particularly small and medium-sized ones, face in adopting AI into their practices.

"By addressing these barriers, the industry can significantly enhance sustainability and efficiency.

"This includes tackling critical data privacy and ethical considerations to ensure responsible and secure AI deployment. Additionally, fostering interdisciplinary collaboration among industry experts, AI researchers and policymakers is essential to drive innovation and develop comprehensive solutions.

"By focusing on these areas, the [construction industry](#) can harness the full potential of AI to promote sustainable development and improve overall project outcomes."

The research was conducted by the City 4.0 Lab which conducts multidisciplinary research to inform industry practice, community programs and government policies, and goals of productive, sustainable and healthy urban life.

More information: Massimo Regona et al, Artificial intelligence and sustainable development goals: Systematic literature review of the construction industry, *Sustainable Cities and Society* (2024). [DOI: 10.1016/j.scs.2024.105499](#)

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