ASSOCIATION OF SCHOOLS OF CONSTRUCTION OF SOUTHERN AFRICA

18TH BUILT ENVIRONMENT CONFERENCE

15-16 JULY 2024

NELSON MANDELA UNIVERSITY, GQEBERHA, SOUTH AFRICA

CONSTRUCTION 5.0: TOWARDS A COLLABORATIVE AND PEOPLE-CENTERED INDUSTRY

In recent times the Industrial Revolution 4.0 also known as IR4.0 has spawned huge, unprecedented and unparalleled investment, effort and energy into the rapid development and implementation of highly innovative technologies on a global scale that include, for example, simulation, automation, Artificial Intelligence (AI), Machine Learning (ML), the Internet of Things (IoT) and robotics. Unfortunately this focus has either ignored or side-lined the human element.

On the other hand, Construction 5.0 (C5.0) which represents the next stage in global construction advancement presents an exciting vision for the future of construction characterized by high efficiency, health and safety, sustainability, and a human-centric focus, where technology complements human skills rather than replacing them. C5.0 will involve up-skilling and re-skilling of the construction workforce to work with new technologies, incorporate the human element into all construction processes, improve working conditions, and foster a culture of creativity and innovation. To be successful, C5.0 must be tailored to the demands of the workers and the industry.

C5.0 is linked to the UN's 17 Sustainable Development Goals (SDGs) for 2030. As such, activities within the industry must be geared towards sustainability and the optimized use of natural resources. C5.0 potentially accelerates both the green and digital transitions, aimed at a more resilient and sustainable society and economy. It prioritizes human-centric design, enhances human-machine collaboration, demands safer and more inclusive construction work spaces, promotes a greener economy, and fuels societal transformation. It emphasizes that people and the environment are significant and deserve protection and places both at the heart of all construction processes throughout all the construction project phases.

It is argued that if executed properly and proficiently, the construction sector will benefit from:

1. Increased profitability and efficiency by optimizing resource allocation, reducing expenditures, and enhancing time effectiveness and management, resulting in increased margins and improved organizational productivity;

2. Environmental sustainability and compliance by highlighting waste minimization and environmental preservation, bringing the construction industry in line with evolving sustainability rules and endorsing responsible practices;

3. Customization and competitive advantage through people-centered technological progress;

4. Adaptability to market dynamics by reinforcing the importance of swift adaptability, flexibility, and responsiveness to shifting market conditions, economic elements, and unexpected occurrences such as the recent global COVID-19 pandemic.

While C5.0 presents considerable advantages and prospects for the industry there most likely exists numerous hurdles to surmount. These hurdles include a reluctance to embrace and invest in advanced technological modifications driven by concerns for the human element; and the need for training and retraining of construction workers with the accompanying demand for substantial investments into comprehensive training and provision of practice opportunities to optimize the training received.

The shift to C5.0 becomes more critical as the construction industry becomes increasingly focused on sustainability with pressure to respond to the challenges of climate change, the depletion of natural resources, and the human impact on natural habitats. The sustainability of construction processes is becoming increasingly important with industry stakeholders having to reduce the environmental impact of the construction industry.

C5.0 promises that construction sites will be 'smart', powered by the Internet of Things (IoT). For example, sensors embedded in equipment, materials, and the built environment will continuously gather data, providing real-time insights into project progress, resource utilization, and health and safety conditions. Building Information Modeling (BIM) and digital twins will become commonplace, enabling simulation, optimization, and predictive maintenance.

Artificial Intelligence (AI) and Machine Learning (ML) will be integral in construction decision-making processes which include identification of the best sites for construction, detection of potential design flaws, prediction of project delays or cost overruns, powering predictive maintenance, and consequently significantly enhance efficiency and reduce risks.

Robotics will play a crucial role in performing complex, repetitive, or hazardous tasks, improving productivity, and health and safety, with the synergy between humans and robots becoming more prominent. Robots will augment human capabilities and learn from human experience and expertise.

The conference seeks responses to questions related to current conversations, debates, and empirical research on the challenges of and opportunities presented by C5.0.

CALL FOR PAPERS

The conference invites full papers within the context of its theme that address, inter alia, in both the public and private sectors

- Current trends and developments
- Innovation
- Opportunities and challenges
- Policies and procedures
- Legislation and regulations
- Practices
- Case studies

Papers will be reviewed according to:

- Relevance to the conference theme
- Objectives and outcomes of the conference
- Originality of the subject matter
- Rigor and robustness of empirical research
- Research design and methods

Selected papers will be published as book chapters and indexed in Scopus

It is intended that these papers will contribute significantly to the existing body of knowledge relative to the science and practice of construction not only in South Africa but everywhere where the products of construction are produced.

Papers should be submitted by email to: papers@asocsa.org

Full Paper Submission: 28 Feb 2024 | **Notice of Acceptance: 31 March 2024** | **Final Paper Submission: 15 May 2024**

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