3D printed house: the digital transformation in architecture and construction of the Sustainable Houses

Assist. Prof. Dr. Hayam M. Omayer

Assistant Professor, Architecture Department, Cairo Higher Institute for Engineering, Computer Science and Management, Cairo, Egypt

hayamomair@gmail.com

Abstract:

There is an increasing demand for sustainable, and dignified housing in the building and construction sector, particularly in developing countries with limited resources, growing energy consumption, population, and CO2 emissions. Therefore, the adoption of digital design, construction, and innovation technology is vital; one of these technologies is 3D printing (3Dp), which has become a recently essential and powerful technology in the construction industry. As such, 3Dp has advantages and potentials over traditional housebuilding in that it can use robotics, software, and advanced materials. The paper investigates the Potentials and limitations of 3DP adoption on digital design and Construction housing projects. Moreover, review and analysis of 3D Printed Houses for evaluation of their performance and future usage capabilities. The study concludes that 3DP technology appears to be a promising alternative to enhance design and construction process performance, address various aspects of advanced materials, affordability, and sustainability, including social and economic aspects. The paper's objectives started with investigating 3Dp adoption in AEC by highlighting the advantages and potentials of 3Dp for sustainable housing. Furthermore, the challenges of 3Dp in Architecture and Construction are discussed.

Keywords:

3d printing; digital design; digital architecture; sustainability.

DOI: 10.21608/MJAF.2021.95150.2487