

Immersive Technology Implementation in the Construction Industry: Modeling Paths of Risk

by Adedeji Olushola Afolabi¹, Chukwuma Nnaji^{2,*} and Chioma Okoro³

1

Department of Building Technology, Covenant University, P.M.B 1023, Ota 112233, Nigeria

2

Department of Civil, Construction and Environmental Engineering, The University of Alabama, 3043 HM Comer, Tuscaloosa, AL 35487, USA

3

Buildings 2022, 12(3), 363; <https://doi.org/10.3390/buildings12030363>

Received: 28 January 2022 / Revised: 25 February 2022 / Accepted: 10 March 2022 / Published: 16 March 2022

Abstract

The purposes of this paper are to identify risk factors impacting the successful implementation of immersive reality technology (ImT) in the construction industry, analyze these risk factors (impact and probability), assess the relationships among different categories of risk factors, and provide recommendations to improve ImT implementation. A literature review, a pilot test based on expert interviews, and a questionnaire survey were used. First, the risk factors of ImT applications were identified by consulting the relevant literature on virtual reality, mixed reality, and augmented reality; these were subsequently grouped into five categories—technology, operation, individual/worker, investment, and external. Next, a questionnaire survey was designed and distributed to relevant construction practitioners in South Africa (usable response = 175). Twenty-one ImT implementation risk factors were identified, and risk criticality scores ranged from 2.02 to 3.18. High investment cost, the need for extensive worker training, and the possible introduction of new risks for workers were rated as significant risks. The present study confirmed three statistically significant hypothesized risk paths—namely, those between external issues and individual/worker’s concerns, between external issues and investment limitations, and between individual/worker’s concerns and technology concerns. The present study contributes to the literature regarding the adoption of construction technology by providing a list of critical risk factors that could be used to develop models and tools for assessing ImT adoption and guide practitioners involved in integrating ImTs.

Keywords:

augmented reality; critical factors; immersive technologies; mixed reality; risk paths; virtual reality; innovation implementation

