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THE CHALLENGES OF VIRTUAL REALITY IMPLEMENTATION IN CONSTRUCTION INDUSTRY

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ABSTRACT

Over the years, the construction industry had immensely grown in pursuing the continuous demand of construction projects and development by allowing continuous improvement in the adoption of advanced digital technologies in construction in line with the rise of the Industry 4.0 paradigm and Virtual Reality being one of the technologies introduced. Previous studies mentioned that Virtual Reality in construction has helped to shape the industry where it helps to improve creation of detailed 3D models with immersive stimulated environment which is very near to a real-life experience. Therefore, this research aims to study the effect of Virtual Reality implementation in the construction industry. The research employed quantitative data collection method which was conducted by questionnaire survey to the construction practitioners to obtain the data. The main barriers of implementing VR technology in construction are including lack of resource, challenges are including insufficient knowledge on the technology regarding its implementation and some constraints on its application due to technical difficulties, security concern, high risk of investment and uncertainties of the industry's practitioners on its effectiveness. Despite the challenges, VR technology is believed to be potentially useful and could contribute to the effectiveness and efficiency of the construction industry in the long run. This is because it is believed that VR can contribute to efficiency construction management tools as well as designing tools. Thus, this research outlined the potentials of VR technology application when implemented the construction industry.

KEYWORDS: Virtual Reality, Construction Industry, Industry 4.0.

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CHAPTER 1.0 INTRODUCTION

1.1 BACKGROUND OF RESEARCH

Virtual Reality (VR) has already been used for quite some time, but due to the advancement of technology it has gained recognition (Razman, 2016). Virtual Reality (VR) is a technology that creates a stimulated environment which allows the user to be placed in an immersed environment with simulated senses which transforms the computer into a gatekeeper between the users and the artificial world (Bardi, 2019). Typically, VR is immediately recognizable through its component which is the Head Mounted Display (HMD). Although VR is usually associated with the gaming industry, there are many benefits of this technology that has yet to be discovered that can be potentially relevant for other industry applications.

For instance, VR can be implemented in the construction industry. Construction industry has always been related with visualization, design, modelling and built environment. This shows close proximity that VR had to the construction industry since it involves the creation and visualization of 3D scenes with the ability to utilize the features which enables the user to explore and interact (Thabet, Shiratuddin, & Bowman, 2002). In addition, the manipulative environment in the VR can help to enhance occupational education and safety, improve architectural design and communication, exceeds owner's expectations and reduce costs (Avhad, 2017). For example, a study conducted by Tuan, Akeem, Chan, & Park, (2014) on experiential learning using VR application regarding safety education in construction through a game technology-based safety training to present a useful way in enhancing the construction safety and health teaching and learning process.

Other than that, Virtual reality can also assist in enhancing decision-making skills. For instance, VR can be potentially useful in the pre-construction stage in a construction