

# Critical Factors Influencing Construction Technology Adoption: A Multivariate Analysis

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**Abstract.** The construction sector is one of the long-established sectors in the world. However, the sector has struggled to acquire effective and basic technology on job sites. This is where the value of new construction technology is critical in driving industry quality and productivity. However, its implementation is at a low level in numerous countries and despite a well-understood lack of technological adoption, the factors influencing this trend are not yet understood. Hence, it is vital to have a thorough understanding of what influences its adoption. This study aims to identify the critical factors influencing technology adoption in the Architecture, Engineering, and Construction (AEC) industry. First, semi-structured interviews with industry practitioners and a systematic literature review of 211 articles yielded 35 factors influencing construction technology adoption. Then, data on the 35 factors were collected through a survey among AEC industry practitioners. In total, 147 valid responses were received and analyzed using mean ranking analysis and exploratory factor analysis. The ranking analysis results indicated that 14 critical factors had been identified. In contrast, through factor analysis, 10 out of 14 critical factors have been grouped into three underlying components: organizational resources, goals, and strategy. The findings could provide construction industry professionals with a useful reference to promote technological adoption in the construction industry.

## INTRODUCTION

While promising construction technologies have emerged over the years, most products, methods, and techniques used in the industry have remained relatively unchanged, resulting in an industry plagued by flat profitability, poor safety records, spiraling prices, massive resource loss, and labor shortages [1]. In addition, when compared to other industries, the adoption of new technology in the construction industry is rather slow [2,3]. Traditional construction methods have reached their limits in satisfying the growing demand for increased productivity, quality, safety, and sustainability [1,5]. However, construction projects continue to use traditional methods although construction technology has been promoted as one of the most promising methods for reforming this sector [4,5].

Some stakeholders are hesitant to embrace new technologies as they believe the risks outweigh benefits, especially when technologies require high adoption costs or changing conventional approaches [6]. Additionally, the World Economic Forum reported a variety of causes that have led to a lack of technological adoption [7]. For example, the conservative corporate culture and lack of progressive thinking have been suggested to impact adoption [7]. Similarly, construction organizations have been reported to place a larger emphasis on defining the ultimate result or output than planning the development process itself, where novel technologies would enable improved processes [7]. These