RISK PERCEPTION IN THE CONSTRUCTION INDUSTRY: A BIBLIOMETRIC REVIEW

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This study presents a bibliometric analysis of the existing literature on risk perception in the construction industry. The aims are to discover patterns, significant topics, and the progression of research on risk perception. The study includes academic publications, such as journal articles, conference papers, and book chapters. The data was acquired from articles indexed on Scopus. VOSviewer was utilized to construct a co-occurrence network using the bibliographic data acquired, and a Sankey diagram was formed to investigate publication trends. Four major study clusters were found, encompassing risk management, safety, construction workers, and prevention actions, all within the context of risk perception in construction research. The current rising research topics related to risk perception in construction are occupational and project safety, construction workers, and human resources. The outcomes of this study can provide comprehension of risk perception in construction and research direction by emphasizing the importance of integrating management, safety, workers, and prevention action perspectives while offering new areas for further exploration regarding risk perception in the construction industry.

Keywords: Risk management, Risk assessment, Construction projects, Construction management.

1 INTRODUCTION

Construction projects are characterized by numerous uncertainties that arise at various stages of their development. These variables provide potential hazards, and risk is a perceived phenomenon. Risk perception, as defined by Douglas and Wildavsky (1990), refers to the capacity to predict and explain which specific individuals will consider certain possible risks to be the most frightening. There are numerous studies in the literature concerning risk perception in construction. In a questionnaire survey, Thomas et al. (2003) examined the perception of risk concerning the management, allocation, and mitigation of construction hazards for highway infrastructure projects in India. They resulted in different risk perceptions between parties in risk management. Hallowell (2010) examined safety risk perception by comparing the risk perception of employees and supervisors. Tixier et al. (2014) investigated the relationship between risk perception, psychological factors, and risk-taking behavior among individuals experiencing various emotional states. Based on the outcomes, the negative group exhibited a greater perception of hazards than the positive group. Namian et al. (2016) emphasized the need to enhance the accurate perception of safety risks and recognition of hazards. The results indicated that those with a higher level of training exhibited a more remarkable ability to perceive safety risks and recognize hazards. Wang et al. (2016) researched the big five personality dimensions and risk perception of construction
project managers in China. Chan et al. (2021) examined the risk perception of safety climate among workers and managers and identified the specific categories for both groups. Pooladvand and Hasanzadeh (2023) focused on construction workers’ physiological and cognitive reactions to risks. They found that high-stress levels had a negative impact on the workers’ ability to perceive risks accurately. Although numerous studies examined risk perception in construction from various perspectives and in diverse contexts, limited studies have specifically focused on risk perception related phenomena in the construction industry. This study performs a bibliometric literature review to examine the publishing trend of risk perception in the construction industry.

2 METHODOLOGY

There are various literature review strategies for gathering current knowledge on a specific topic. The systematic literature review is a method used to analyze and summarize data reproducibly (Linnenluecke et al. 2020). The research employs systematic mapping and bibliometric analysis to arrange and examine risk perception in the construction industry.

A systematic review involves a thorough search of specific databases. Scopus is a comprehensive database and one of the most esteemed academic search engines (Linnenluecke et al. 2020, Calik et al. 2023).

The research methodology employed in this paper is illustrated in Figure 1.

![Flowchart of research methodology](image)

**Figure 1.** Flowchart of research methodology. T/A/K = title, abstract, and keyword search.

The subsequent subsections outline the process in four steps: (1) research question, and (2) data gathering, (3) data elimination, and (4) mapping process.
2.1 Step 1. Research Question

Construction risks encompass not only quantitative models but also incorporate social factors. This study considers the latest research topics and trends related to and researched the “risk perception” concept in the construction industry.

2.2 Step 2. Data Gathering

Scopus is extensively utilized for literature reviews due to its high dependability and efficiency. T/A/K (title, abstract, and keyword search) was employed to obtain all associated documents from the Scopus database. The keywords for the study were “risk perception” AND “construction.” A total of 2874 publications were retrieved.

2.3 Step 3. Data Elimination

Document elimination was performed in order to select related literature. Publications containing any of the specified features were excluded from this study: (1) not including the “risk perception” concept in the abstract part, (2) original documents that were not in English, (3) document types were out of an article, conference paper, and book chapter, (4) not being directly related to the construction industry. After elimination, 96 publications remained, including 60 journal articles, 34 conference papers, and two book chapters.

2.4 Step 4. Mapping Process

VOSviewer is a software application designed to create and display bibliometric networks by analyzing relationships such as bibliographic coupling, co-authorship, co-occurrence, citations, or co-citation (Van Eck and Waltman 2014). In order to identify the trends related to the research topic, keyword co-occurrence analyses were conducted in VOSviewer (ver. 1.6.20). The SankeyMATIC tool was utilized to visually represent the trends in publications.

3 RESULTS & DISCUSSIONS

The density visualization of the co-occurrence of keywords from the bibliographic portfolio was illustrated in Figure 2. The text contains significant mentions of terminology such as "risk perception" with "risk management," "project management," and "risk assessment," along with their conjunction with the terms "occupational risks," "hazards," and "safety engineering," with four co-occurring keyword clusters.

The red cluster was characterized as "Construction Risk Management with Risk Perception." The group has 21 keywords, primarily focused on risk management, evaluation, and analysis in construction projects and building design. The Green cluster was identified as "Project Safety and Risk Perception in the Construction Industry," consisting of 14 keywords. It primarily focuses on safety engineering, safety management, safety culture, health risks, and human resource management. The blue cluster consists of 13 elements, focusing on occupational risks, hazard identification and recognition, and personnel and safety training for construction workers. This cluster is specifically named "Construction Workers and Risk Perception." The last cluster is yellow and comprises five keywords, with the primary ones being accident and disaster prevention and risk-taking behaviors. The yellow cluster is categorized as "Prevention Action and Risk Perception in Construction."
Figure 2. Network visualization of co-occurrence of keywords.

Figure 3. Overlay network visualization of co-occurrence keywords.

The distribution of trend study subjects in construction with risk perception is depicted in Figure 3. Based on the data, it appears that the focus has shifted from "Construction Risk
Management with Risk Perception" to primarily "Construction Workers and Risk Perception" and "Project Safety and Risk Perception in the Construction Industry". These phenomena encompass identifying and recognizing hazards and occupational risks, ensuring safety in construction activities, and managing human resources in the construction industry.

In order to identify the profile of the publications, a Sankey diagram is employed, which is a visualization tool that simultaneously represents numerous properties (Linnenluecke et al., 2020). Figure 4 depicts the distribution of publication sources and the years of the studies using a Sankey diagram. 60 articles published in 19 journals, 34 conference paper in 8 conferences and 2 book chapters were analyzed. Figure 4 indicates that most articles discussing the notion of risk perception in the construction industry are published in Journal of Construction Engineering and Management, Construction Management and Economics, International Journal of Project Management and Sustainability. Additionally, Construction Research Congress, International Structural Engineering and Construction Conference, and Association of Researchers in Construction Management Conference are the preeminent conferences concerning this subject matter. Furthermore, there has been a growing inclination towards researching risk perception in the construction industry in recent years.

Figure 4. Overlay network visualization of co-occurrence keywords.
4 CONCLUSIONS

To sum up, risk perception is an essential phenomenon in the construction industry. The bibliometric literature review study investigated the related research topic and publication trends for risk perception in construction. 96 publications were reviewed, and their co-occurrence and bibliometric analysis were performed. Four primary research clusters were identified, which mainly included risk management, safety, construction workers, and prevention actions concepts with risk perception in the construction research topic. Furthermore, research on risk perception in the construction industry has shown that occupational and project safety, construction workers, and human resources are current trending research areas of investigation. Finally, this study's conclusions determine the growing interest in researching risk perception within the construction industry. The findings of this study can offer researchers a research direction and new areas for further investigation. To enhance the proposed study, it is recommended to conduct searches in additional databases with Scopus. Furthermore, it would be beneficial to include publications in languages other than English. Additionally, forming distinct clusters will aid in identifying and developing research subjects related to risk perception in the construction industry.

References


