

A comprehensive review of the Swiss cheese model in risk management

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Abstract

The SCM, developed by James Reason in the 1990s, is a widely recognized and influential model used to understand and manage complex systems and their associated risks. The aim of this review paper is to provide a comprehensive analysis of the Swiss Cheese Model (SCM) in the context of risk management. To conduct this review, an extensive literature search was performed using reputable academic databases, including PubMed, African Journals Online, Science Direct, Scopus, Springer, Google Scholar, and Sage Publications. The search included keywords such as SCM; Risk Management; Error Management and Risk Assessment. English journals published up to 2023 were considered for inclusion in this review. The review reveals that the SCM has been widely adopted across various industries, including healthcare, aviation, nuclear power, and transportation. Numerous studies have demonstrated its effectiveness in identifying potential risks, understanding their underlying causes, and implementing preventive measures. The model's core concept of multiple layers of defenses, represented by slices of cheese with holes (potential weaknesses), has proven valuable in visualizing how errors or failures can occur within complex systems. The review highlights the importance of organizational culture and leadership in successfully implementing the SCM. Results show that a positive safety culture, open communication channels, and strong leadership support are crucial for creating an environment where the SCM can be effectively utilized. This comprehensive review affirms the significance of the SCM as a valuable tool in risk management. However, recommendations shows that future research should focus on further refining the model's application in specific domains and exploring the importance of integrating it with other risk management frameworks.

Keywords: Swiss cheese model, Risk management, Error management, Accident prevention, Risk assessment, Hazard identification, Risk mitigation.