

# Application of Generative AI in Information Security Research - a Systematic Literature Review

Leila Aro-Sati, Fredrik Karlsson, Shang Gao, Elham Rostami

*Department of Informatics, School of Business, Örebro University, Sweden*

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## Abstract

As technological advancements continue to evolve in our interconnected world, the importance of organizational information security has never been more crucial. As such, organizations face both internal and external information security threats which can compromise the confidentiality, integrity and availability of their sensitive data. To address these challenges, researchers and practitioners are exploring innovative approaches to strengthen information security within organizations. One promising advancement is Generative AI (GenAI) which can produce new content such as text, images, audio, and video by generating synthetic data that closely resemble real-world data. For example, in information security GenAI can potentially enhance the capabilities of vulnerability scanning tools, construct improved code security, investigate vulnerabilities, can be used as an assistant to generate ideas during attack simulation, etc.

This systematic literature review analyzes the emerging applications of GenAI in information security through the classical sociotechnical framework of Bostrom and Heinen (1977). The sociotechnical perspective acknowledges that a system's outcomes depend on mutual influences between technical and social structures. As such, findings are organized across the dimensions of Structure, People, Physical System, Task, and their interrelations.

The preliminary findings show that GenAI offers considerable technical advancements and promotes potential advancements in information security. However, current research overlooks a sociotechnical implications which consider human, organizational, and technical factors in combination. Only a minority of studies reflect on human involvement or the organizational aspects of GenAI implementation. Yet, effective deployment of the GenAI models requires the adaptation of tools, people, processes, and governance. This systematic literature review calls for a more balanced sociotechnical approach in GenAI and information security research. Future research could expand beyond technological aspects, for example, to examine how GenAI reshapes roles, decision-making processes, and information policy design within organizations.

**Keywords:** Generative AI (GenAI), Information Security, Socio-Technical Systems (STS) framework

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